

65

SEQUENCE LISTING

<110> HAYNES, Barton F. GAO, Feng KORBER, Bette T. HAHN, Beatrice H. SHAW, George M. KOTHE, DENISE LI, Ying Ying DECKER, Julie LIAO, Hua-Xin <120> CONSENSUS/ANCESTRAL IMMUNOGENS <130> 01579-1093 <140> 10/572,638 <141> 2006-12-22 <150> PCT/US2004/03097 <151> 2004-09-17 <150> 60/604,722 <151> 2004-08-27 <150> 60/503,460 <151> 2003-09-17 <160> 321 <170> PatentIn Ver. 3.3 <210> 1 <211> 866 <212> PRT <213> Human immunodeficiency virus <400> 1 Met Arg Val Met Gly Ile Gln Arg Asn Cys Gln His Leu Trp Arg Trp 10 Gly Thr Met Ile Leu Gly Met Leu Met Ile Cys Ser Ala Ala Glu Asn 20 Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Asn 40

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His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp

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Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Leu Arg Asp Lys Lys 145 150 155 160

Lys Lys Val Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn 165 170 175

Glu Asn Ser Ser Glu Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile 180 185 190

Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr 195 200 205

Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe

Asn 225	Gly	Thr	Gly	Pro	Cys 230	Asn	Asn	Val	Ser	Thr 235	Val	Gln	Cys	Thr	His 240
Gly	Ile	Lys	Pro	Val 245	Val	Ser	Thr	Gln	Leu 250	Leu	Leu	Asn	Gly	Ser 255	Leu
Ala	Glu	Glu	Glu 260	Ile	Ile	Ile	Arg	Ser 265	Glu	Asn	Leu	Thr	Asn 270	Asn	Ala
Lys	Thr	Ile 275	Ile	Val	His	Leu	Asn 280	Glu	Ser	Val	Glu	Ile 285	Val	Cys	Thr
Arg	Pro 290	Asn	Asn	Asn	Thr	Arg 295	Lys	Ser	Ile	Arg	Ile 300	Gly	Pro	Gly	Gln
Thr 305	Phe	Tyr	Ala	Thr	Gly 310	Asp	Ile	Ile	Gly	Asp 315	Ile	Arg	Gln	Ala	His 320
Cys	Asn	Ile	Ser	Glu 325	Asp	Lys	Trp	Asn	Lys 330	Thr	Leu	Gln	Arg	Val 335	Ser
Lys	Lys	Leu	Lys 340	Glu	His	Phe	Pro	Asn 345	Lys	Thr	Ile	Lys	Phe 350	Glu	Pro
Ser	Ser	Gly 355	Gly	Asp	Leu	Glu	Ile 360	Thr	Thr	His	Ser	Phe 365	Asn	Cys	Arg
Gly	Glu 370	Phe	Phe	Tyr	Cys	Asn 375	Thr	Ser	Lys	Leu	Phe 380	Asn	Ser	Thr	Tyr
Asn 385	Asn	Asn	Thr	Asn	Ser 390	Asn	Ser	Thr	Ile	Thr 395	Leu	Pro	Cys	Arg	Ile 400
Lys	Gln	Ile	Ile	Asn 405	Met	Trp	Gln	Glu	Val 410	Gly	Arg	Ala	Met	Tyr 415	Ala
Pro	Pro	Ile	Ala 420	Gly	Asn	Ile	Thr	Cys 425	Lys	Ser	Asn	Ile	Thr 430	Gly	Leu
Leu	Leu	Thr 435	Arg	Asp	Gly	Gly	Lys 440	Lys	Asn	Thr	Thr	Glu 445	Ile	Phe	Arg
Pro	Gly 450	Gly	Gly	Asp	Met	Arg 455	Asp	Asn	Trp	Arg	Ser 460	Glu	Leu	Tyr	Lys
Tyr 465	Lys	Val	Val	Glu	Ile 470	Lys	Pro	Leu	Gly	Val 475	Ala	Pro	Thr	Lys	Ala 480
Lys	Arg	Arg	Val	Val 485	Glu	Arg	Glu	Lys	Arg 490	Ala	Val	Gly	Ile	Gly 495	Ala
Val	Phe	Leu	Gly 500	Phe	Leu	Gly	Ala	Ala 505	Gly	Ser	Thr	Met	Gly 510	Ala	Ala
Ser	Ile	Thr	Leu	Thr	Val	Gln	Ala	Arg	Gln	Leu	Leu	Ser	Gly	Ile	Val

Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met 535 Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Thr Arg Val Leu Ala Ile Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser 580 585 Trp Ser Asn Lys Ser Gln Glu Asp Ile Trp Asp Asn Met Thr Trp Met 600 Gln Trp Asp Arg Glu Ile Ser Asn Tyr Thr Asp Thr Ile Tyr Arg Leu 610 615 Leu Glu Asp Ser Gln Asn Gln Gln Glu Lys Asn Glu Lys Asp Leu Leu 625 Ala Leu Asp Ser Trp Lys Asn Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg 680 Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr Pro Asn Pro Arg 695 690 Gly Pro Asp Arg Leu Gly Arg Ile Glu Glu Glu Gly Gly Glu Gln Asp 705 Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp 730 Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Val Ala Ala Arg Ala Val Glu Leu Leu Gly Arg Ser Ser Leu Arg Gly Leu Gln Arg Gly Trp Glu Ala Leu Lys Tyr Leu Gly Ser 770 775 Leu Val Gln Tyr Trp Gly Leu Glu Leu Lys Lys Ser Ala Ile Ser Leu Leu Asp Thr Ile Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile 810 Glu Leu Ile Gln Arg Ile Cys Arg Ala Ile Arg Asn Ile Pro Arg Arg

820 825 830

Ile Arg Gln Gly Phe Glu Ala Ala Leu Gln 835 840

<210> 7 <211> 842 <212> PRT

<213> Human immunodeficiency virus

<400> 7

Met Arg Val Met Gly Ile Leu Arg Asn Cys Gln Gln Trp Trp Ile Trp 1 5 10 15

Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Asn Val Val Gly Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Lys Glu Val
50 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Met Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Arg Asn Val Thr Asn Ala Thr Asn Asn Thr Tyr Asn Glu Glu 130 135 140

Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Leu Arg Asp Lys Lys 145 150 155 160

Lys Lys Val Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn 165 170 175

Glu Asn Ser Ser Glu Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile 180 185 190

Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr 195 200 205

Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe 210 220

Asn Gly Thr Gly Pro Cys Asn Asn Val Ser Thr Val Gln Cys Thr His 225 230 235 240

- Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu 250 245 Ala Glu Glu Glu Ile Ile Arg Ser Glu Asn Leu Thr Asn Asn Ala 265 Lys Thr Ile Ile Val His Leu Asn Glu Ser Val Glu Ile Val Cys Thr 275 Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln 295 Thr Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser Glu Asp Lys Trp Asn Lys Thr Leu Gln Arg Val Ser Lys Lys Leu Lys Glu His Phe Pro Asn Lys Thr Ile Lys Phe Glu Pro 345 Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Arg 360 Gly Glu Phe Phe Tyr Cys Asn Thr Ser Lys Leu Phe Asn Ser Thr Tyr 370 375 Asn Asn Asn Thr Asn Ser Asn Ser Thr Ile Thr Leu Pro Cys Arg Ile 395
- Ash Ash Ash The Ash Ser Ash Ser The Tree The Lett Tro eys Arg Tree 385 390 395 400

 Lys Gln Ile Ile Ash Met Trp Gln Glu Val Gly Arg Ala Met Tyr Ala 405 410 415
- Pro Pro Ile Ala Gly Asn Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu 420 425 430
- Leu Leu Thr Arg Asp Gly Gly Lys Lys Asn Thr Thr Glu Ile Phe Arg 435 440 445
- Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys 450 455 460
- Tyr Lys Val Val Glu Ile Lys Pro Leu Gly Val Ala Pro Thr Lys Ala 465 470 475 480
- Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala
 485
 490
 495
- Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala 500 505 510
- Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val 515 520 525
- Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met 530 535 540

ьеи 545	GIN	Leu	Thr	Val	1rp 550	GIY	11e	гуs	GIn	Leu 555	Gin	Thr	Arg	vaı	ьеи 560
Ala	Ile	Glu	Arg	Tyr 565	Leu	Lys	Asp	Gln	Gln 570	Leu	Leu	Gly	Ile	Trp 575	Gly
Cys	Ser	Gly	Lys 580	Leu	Ile	Cys	Thr	Thr 585	Ala	Val	Pro	Trp	Asn 590	Ser	Ser
Trp	Ser	Asn 595	Lys	Ser	Gln	Glu	Asp 600	Ile	Trp	Asp	Asn	Met 605	Thr	Trp	Met
Gln	Trp 610	Asp	Arg	Glu	Ile	Ser 615	Asn	Tyr	Thr	Asp	Thr 620	Ile	Tyr	Arg	Leu
Leu 625	Glu	Asp	Ser	Gln	Asn 630	Gln	Gln	Glu	Lys	Asn 635	Glu	Lys	Asp	Leu	Leu 640
Ala	Leu	Asp	Ser	Trp 645	Lys	Asn	Leu	Trp	Asn 650	Trp	Phe	Asp	Ile	Thr 655	Asn
Trp	Leu	Trp	Tyr 660	Ile	Lys	Ile	Phe	Ile 665	Met	Ile	Val	Gly	Gly 670	Leu	Ile
Gly	Leu	Arg 675	Ile	Ile	Phe	Ala	Val 680	Leu	Ser	Ile	Val	Asn 685	Arg	Val	Arg
Gln	Gly 690	Tyr	Ser	Pro	Leu	Ser 695	Phe	Gln	Thr	Leu	Thr 700	Pro	Asn	Thr	Arg
Gly 705	Pro	Asp	Arg	Leu	Gly 710	Arg	Ile	Glu	Glu	Glu 715	Gly	Gly	Glu	Gln	Asp 720
Arg	Asp	Arg	Ser	Ile 725	Arg	Leu	Val	Ser	Gly 730	Phe	Leu	Ala	Leu	Ala 735	Trp
Asp	Asp	Leu	Arg 740	Ser	Leu	Cys	Leu	Phe 745	Ser	Tyr	His	Arg	Leu 750	Arg	Asp
Phe	Ile	Leu 755	Val	Ala	Ala	Arg	Ala 760	Val	Glu	Leu	Leu	Gly 765	Arg	Ser	Ser
Leu	Arg 770	Gly ·	Leu	Gln	Arg	Gly 775	Trp	Glu	Ala	Leu	Lys 780	Tyr	Leu	Gly	Ser
Leu 785	Val	Gln	Tyr	Trp	Gly 790	Leu	Glu	Leu	Lys	Lys 795	Ser	Ala	Ile	Ser	Leu 800
Leu	Asp	Thr	Ile	Ala 805	Ile	Ala	Val	Ala	Glu 810	Gly	Thr	Asp	Arg	Ile 815	Ile
Glu	Leu	Ile	Gln 820	Arg	Ile	Cys	Arg	Ala 825	Ile	Arg	Asn	Ile	Pro 830	Arg	Arg
Ile	Arg	Gln 835	Gly	Phe	Glu	Ala	Ala 840	Leu	Gln						

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<210> 8
<211> 842
<212> PRT
<213> Human immunodeficiency virus
<400> 8
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Met Arg Val Met Gly Ile Leu Arg Asn Cys Gln Gln Trp Trp Ile Trp

1 5 10 15

Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Ser Val Val Gly Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Arg Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Met Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asn Val Thr Asn Ala Thr Asn Asn Thr Tyr Asn Gly Glu 130 135 140

Met Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Leu Arg Asp Lys Lys 145 150 155 160

Lys Lys Glu Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn 165 170 175

Glu Asn Ser Ser Glu Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile 180 185 190

Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr 195 200 205

Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe 210 215 220

Asn Gly Thr Gly Pro Cys Asn Asn Val Ser Thr Val Gln Cys Thr His 225 230 235 240

Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu 245 250 255

Ala Glu Glu Ile Ile Ile Arg Ser Glu Asn Leu Thr Asp Asn Ala 260 265 270

L	ys	Thr	Ile	Ile	Val	Gln	Leu	Asn	Glu	Ser	Val	Glu	Ile	Val	Cys	Thr
			275					280					285			

- Arg Pro Asn Asn Thr Arg Lys Ser Met Arg Ile Gly Pro Gly Gln
 290 295 300
- Thr Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His 305 310 315 320
- Cys Asn Ile Ser Glu Asp Lys Trp Asn Lys Thr Leu Gln Gln Val Ala 325 330 335
- Glu Lys Leu Gly Lys His Phe Pro Asn Lys Thr Ile Thr Phe Glu Pro 340 345 350
- Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Arg 355 360 365
- Gly Glu Phe Phe Tyr Cys Asn Thr Ser Lys Leu Phe Asn Ser Thr Tyr 370 375 380
- Asn Asn Asn Thr Asn Ser Asn Ser Thr Ile Thr Leu Pro Cys Arg Ile 385 390 395 400
- Lys Gln Ile Ile Asn Met Trp Gln Gly Val Gly Gln Ala Met Tyr Ala 405 410 415
- Pro Pro Ile Ala Gly Asn Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu 420 425 430
- Leu Leu Thr Arg Asp Gly Gly Lys Glu Asn Thr Thr Glu Thr Phe Arg
 435 440 445
- Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys 450 455 460
- Tyr Lys Val Val Glu Ile Lys Pro Leu Gly Val Ala Pro Thr Glu Ala 465 470 475 480
- Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Leu Gly Ala
 485 490 495
- Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala 500 505 510
- Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val 515 520 525
- Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met 530 535 540
- Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu 545 550 555 560
- Ala Met Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly 565 570 575

Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser 580 585 590

Trp Ser Asn Lys Ser Leu Glu Asp Ile Trp Asp Asn Met Thr Trp Met 595 600 605

Glu Trp Asp Arg Glu Ile Ser Asn Tyr Thr Asp Thr Ile Tyr Arg Leu 610 615 620

Leu Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu 625 630 635 640

Ala Leu Asp Ser Trp Glu Asn Leu Trp Asn Trp Phe Asp Ile Thr Asn 645 650 655

Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile
660 665 670

Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg 675 680 685

Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr Pro Asn Thr Arg 690 695 700

Gly Pro Asp Arg Leu Glu Arg Ile Glu Glu Glu Gly Gly Glu Gln Asp 705 710 715 720

Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp
725 730 735

Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp
740 745 750

Phe Ile Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly Arg Ser Ser 755 760 765

Leu Arg Gly Leu Gln Arg Gly Trp Glu Ala Leu Lys Tyr Leu Gly Ser 770 780

Leu Val Gln Tyr Trp Gly Gln Glu Leu Lys Lys Ser Ala Ile Ser Leu 785 790 795 800

Leu Asp Thr Ile Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile 805 810 815

Glu Val Val Gln Arg Ala Cys Arg Ala Ile Leu Asn Ile Pro Arg Arg 820 825 830

Ile Arg Gln Gly Phe Glu Ala Ala Leu Leu 835 840

<210> 9

<211> 493

<212> PRT

<213> Human immunodeficiency virus

<400> 9

Met Gly Ala Arg Ala Ser Ile Leu Arg Gly Gly Lys Leu Asp Thr Trp

1 5 10 15

Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Arg Tyr Met Ile Lys 20 25 30

His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro 35 40 45

Gly Leu Leu Glu Thr Ser Glu Gly Cys Lys Gln Ile Met Lys Gln Leu
50 60

Gln Pro Ala Leu Gln Thr Gly Thr Glu Glu Leu Arg Ser Leu Tyr Asn
65 70 75 80

Thr Val Ala Thr Leu Tyr Cys Val His Glu Lys Ile Glu Val Arg Asp
85 90 95

Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Asn Lys Ser Gln
100 105 110

Gln Lys Thr Gln Gln Ala Glu Ala Ala Ala Asp Gly Lys Val Ser Gln
115 120 125

Asn Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His Gln Ala 130 135 140

Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu Glu Lys 145 150 155 160

Ala Phe Ser Pro Glu Val Ile Pro Met Phe Thr Ala Leu Ser Glu Gly
165 170 175

Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His
180 185 190

Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala 195 200 205

Glu Trp Asp Arg Leu His Pro Val His Ala Gly Pro Ile Ala Pro Gly 210 215 220

Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Thr 225 230 235 240

Leu Gln Glu Gln Ile Ala Trp Met Thr Ser Asn Pro Pro Val Pro Val
245 250 255

Gly Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val 260 265 270

Arg Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Lys Gln Gly Pro Lys 275 280 285

Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala

290 295 300

Glu Gln Ala Thr Gln Asp Val Lys Asn Trp Met Thr Asp Thr Leu Leu 305 310 315 320

Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Arg Ala Leu Gly 325 330 335

Pro Gly Ala Ser Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly 340 345 350

Gly Pro Ser His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Ala 355 360 365

Asn Asn Thr Asn Ile Met Met Gln Arg Ser Asn Phe Lys Gly Pro Lys 370 375 380

Arg Ile Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile Ala Arg 385 390 395 400

Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu 405 410 415

Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly
420 425 430

Lys Ile Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe Leu Gln Ser 435 440 445

Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Arg Phe Glu Glu
450 455 460

Thr Thr Pro Ala Pro Lys Gln Glu Pro Lys Asp Arg Glu Pro Leu Thr 465 470 475 480

Ser Leu Lys Ser Leu Phe Gly Ser Asp Pro Leu Ser Gln 485 490

<210> 10

<211> 207

<212> PRT

<213> Human immunodeficiency virus

<400> 10

Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Ala Val

Arg Glu Arg Ile Arg Arg Thr Glu Pro Ala Ala Glu Gly Val Gly Ala

Ala Ser Gln Asp Leu Asp Lys Tyr Gly Ala Leu Thr Ser Ser Asn Thr 35 40 45

Ala Thr Asn Asn Ala Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu 50 55 60

Glu Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met 65 70 75 80

Thr Tyr Lys Ala Ala Phe Asp Leu Ser Phe Phe Leu Lys Glu Lys Gly 85 90 95

Gly Leu Glu Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp 100 105 110

Leu Trp Val Tyr His Thr Gln Gly Phe Phe Pro Asp Trp Gln Asn Tyr 115 120 125

Thr Pro Gly Pro Gly Val Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe 130 135 140

Glu Asn Asn Cys Leu Leu His Pro Met Ser Gln His Gly Met Glu Asp 165 170 175

Glu Asp Arg Glu Val Leu Lys Trp Lys Phe Asp Ser His Leu Ala Arg 180 185 190

Arg His Met Ala Arg Glu Leu His Pro Glu Tyr Tyr Lys Asp Cys
195 200 205

<210> 11

<211> 1491

<212> DNA

<213> Human immunodeficiency virus

<400> 11

gccgccgcca tgggcgcccg cgccagcatc ctgcgcggcg gcaagctgga cacctgggag 60 aagatccgcc tgcgccccgg cggcaagaag cgctacatga tcaagcacct ggtgtgggcc 120 agccgcgagc tggagcgctt cgccctgaac cccggcctgc tggagaccag cgagggctgc 180 aagcagatca tgaagcagct gcagcccgcc ctgcagaccg gcaccgagga gctgcgcagc 240 ctgtacaaca ccgtggccac cctgtactgc gtgcacgaga agatcgaggt gcgcgacacc 300 aaggaggccc tggacaagat cgaggaggag cagaacaaga gccagcagaa gacccagcag 360 gccgaggccg ccgccgacgg caaggtgagc cagaactacc ccatcgtgca gaacctgcag 420 ggccagatgg tgcaccaggc catcagcccc cgcaccctga acgcctgggt gaaggtgatc 480 gaggagaagg ccttcagccc cgaggtgatc cccatgttca ccgccctgag cgagggcgcc 540 acccccagg acctgaacac catgctgaac accgtgggcg gccaccaggc cgccatgcag 600 atgctqaaqq acaccatcaa cgaggaggcc gccgagtggg accgcctgca ccccgtgcac 660 geeggeecea tegeeceegg ceagatgege gageecegeg geagegaeat egeeggeaec 720 accagcaccc tgcaggagca gatcgcctgg atgaccagca accccccgt gcccgtgggc 780 qacatctaca agcqctggat catcctgggc ctgaacaaga tcgtgcgcat gtacagcccc 840 gtgagcatcc tggacatcaa gcagggcccc aaggagccct tccgcgacta cgtggaccgc 900 ttcttcaaga ccctgcgcgc cgagcaggcc acccaggacg tgaagaactg gatgaccgac 960 accetgetgg tgcagaacge caaccecgae tgcaagacca teetgegege cetgggeece 1020 ggcgccagcc tggaggagat gatgaccgcc tgccagggcg tgggcggccc cagccacaag 1080 gcccgcgtgc tggccgaggc catgagccag gccaacaaca ccaacatcat gatgcagcgc 1140 agcaacttca agggccccaa gcgcatcgtg aagtgcttca actgcggcaa ggagggccac 1200 ategecegea aetgeegege eeceegeaag aagggetget ggaagtgegg caaggaggge 1260 caccagatga aggactgcac cgagcgccag gccaacttcc tgggcaagat ctggcccagc 1320 cacaagggcc gccccggcaa cttcctgcag agccgccccg agcccaccgc ccccccgcc 1380

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Lys Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg

633

Asp Lys Lys Gln Lys Val Tyr Ala Leu Phe Tyr Arg Leu Asp Val Val 165 170 175

Pro Ile Asp Asp Asn Asn Asn Ser Ser Asn Tyr Arg Leu Ile Asn 180 185 190

Cys Asn Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu 195 200 205

Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys 210 215 220

Cys Asn Asp Lys Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser 225 230 235 240

Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu 245 250 255

Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Arg Ser Glu
260 265 270

Asn Ile Thr Asn Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Glu Ser 275 280 285

Val Glu Ile Asn Cys Thr Arg Pro Asn Asn Thr Arg Lys Ser Ile 290 295 300

Arg Ile Gly Pro Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly 305 310 315 320

Asp Ile Arg Gln Ala His Cys Asn Ile Ser Gly Thr Lys Trp Asn Lys 325 330 335

Thr Leu Gln Gln Val Ala Lys Lys Leu Arg Glu His Phe Asn Asn Lys 340 345 350

Thr Ile Ile Phe Lys Pro Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr 355 360 365

His Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Ser Gly 370 375 380

Leu Phe Asn Ser Thr Trp Ile Gly Asn Gly Thr Lys Asn Asn Asn Asn 385 390 395 400

Thr Asn Asp Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn
405
410
415

Met Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Glu Gly
420 425 430

Lys Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp 435 440 445

Gly Gly Asn Asn Asn Thr Asn Glu Thr Glu Ile Phe Arg Pro Gly Gly

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790

795

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Asn Asn Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp 100 105

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Asn Met Lys Gly Glu Ile Lys Asn Cys Ser Phe Asn Met Thr Thr Glu 155 145 150

Leu Arg Asp Lys Lys Gln Lys Val Tyr Ser Leu Phe Tyr Lys Leu Asp 170 165

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<211> 497

<212> PRT

<213> Human immunodeficiency virus

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- Gly Leu Leu Glu Thr Ser Glu Gly Cys Lys Gln Ile Ile Gly Gln Leu
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- Gln Pro Ala Leu Gln Thr Gly Ser Glu Glu Leu Arg Ser Leu Tyr Asn 65 70 75 80
- Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Glu Val Lys Asp
 85 90 95
- Thr Lys Glu Ala Leu Glu Lys Ile Glu Glu Glu Gln Asn Lys Ser Gln
 100 105 110
- Gln Lys Thr Gln Gln Ala Ala Ala Asp Lys Gly Asn Ser Ser Lys Val 115 120 125
- Ser Gln Asn Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His 130 135 140
- Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu 145 150 155 160
- Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser 165 170 175
- Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly
 180 185 190
- Gly His Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu
 195 200 205
- Ala Ala Glu Trp Asp Arg Leu His Pro Val His Ala Gly Pro Ile Pro 210 215 220
- Pro Gly Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr 225 230 235 240
- Ser Thr Leu Gln Glu Gln Ile Ala Trp Met Thr Ser Asn Pro Pro Ile 245 250 255
- Pro Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys

260 265 270

Ile Val Arg Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly 275 280 285

Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu 290 295 300

Arg Ala Glu Gln Ala Thr Gln Asp Val Lys Asn Trp Met Thr Asp Thr 305 310 315 320

Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala 325 330 335

Leu Gly Pro Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly 340 345 350

Val Gly Gly Pro Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser 355 360 365

Gln Val Thr Asn Ala Ala Ile Met Met Gln Arg Gly Asn Phe Lys Gly 370 375 380

Gln Arg Arg Ile Ile Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile 385 390 395 400

Ala Arg Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly
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Lys Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe 420 425 430

Leu Gly Lys Ile Trp Pro Ser Asn Lys Gly Arg Pro Gly Asn Phe Leu
435 440 445

Gln Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Gly Phe 450 455 460

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Pro Pro Leu Thr Ser Leu Lys Ser Leu Phe Gly Asn Asp Pro Leu Ser 485 490 495

Gln

<210> 22

<211> 948

<212> PRT

<213> Human immunodeficiency virus

<400> 22

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His Gln Lys Glu Pro Pro Phe Leu Trp Met Gly Tyr Glu Leu His Pro 325 Asp Lys Trp Thr Val Gln Pro Ile Gln Leu Pro Glu Lys Asp Ser Trp Thr Val Asn Asp Ile Gln Lys Leu Val Gly Lys Leu Asn Trp Ala Ser Gln Ile Tyr Pro Gly Ile Lys Val Lys Gln Leu Cys Lys Leu Leu Arg Gly Ala Lys Ala Leu Thr Asp Ile Val Pro Leu Thr Glu Glu Ala Glu 395 Leu Glu Leu Ala Glu Asn Arg Glu Ile Leu Lys Glu Pro Val His Gly 405 Val Tyr Tyr Asp Pro Ser Lys Asp Leu Ile Ala Glu Ile Gln Lys Gln 425 Gly Gln Asp Gln Trp Thr Tyr Gln Ile Tyr Gln Glu Pro Phe Lys Asn Leu Lys Thr Gly Lys Tyr Ala Lys Met Arg Ser Ala His Thr Asn Asp 455 450 Val Lys Gln Leu Thr Glu Ala Val Gln Lys Ile Ala Thr Glu Ser Ile Val Ile Trp Gly Lys Thr Pro Lys Phe Arg Leu Pro Ile Gln Lys Glu 490 495 Thr Trp Glu Thr Trp Trp Thr Glu Tyr Trp Gln Ala Thr Trp Ile Pro 505 Glu Trp Glu Phe Val Asn Thr Pro Pro Leu Val Lys Leu Trp Tyr Gln 520 Leu Glu Lys Glu Pro Ile Ala Gly Ala Glu Thr Phe Tyr Val Asp Gly 530 535 Ala Ala Asn Arg Glu Thr Lys Leu Gly Lys Ala Gly Tyr Val Thr Asp 555 Arg Gly Arg Gln Lys Val Val Ser Leu Thr Glu Thr Thr Asn Gln Lys 570 565 Thr Glu Leu Gln Ala Ile His Leu Ala Leu Gln Asp Ser Gly Ser Glu 580 585 Val Asn Ile Val Thr Asp Ser Gln Tyr Ala Leu Gly Ile Ile Gln Ala Gln Pro Asp Lys Ser Glu Ser Glu Leu Val Asn Gln Ile Ile Glu Gln 620 615

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Arg	Lys	Val	Leu 660	Phe	Leu	Asp	Gly	Ile 665	Asp	Lys	Ala	Gln	Glu 670	Glu	His
Glu	Lys	Tyr 675	His	Ser	Asn	Trp	Arg 680	Ala	Met	Ala	Ser	Asp 685	Phe	Asn	Leu
Pro	Pro 690	Ile	Val	Ala	Lys	Glu 695	Ile	Val	Ala	Ser	Cys 700	Asp	Lys	Cys	Gln
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Trp	Gln	Leu	Asp	Cys 725	Thr	His	Leu	Glu	Gly 730	Lys	Ile	Ile	Leu	Val 735	Ala
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Thr	Gly	Gln 755	Glu	Thr	Ala	Tyr	Phe 760	Ile	Leu	Lys	Leu	Ala 765	Gly	Arg	Trp
Pro	Val 770	Lys	Val	Ile	His	Thr 775	Asp	Asn	Gly	Ser	Asn 780	Phe	Thr	Ser	Ala
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Ile	Pro	Tyr	Asn	Pro 805	Gln	Ser	Gln	Gly	Val 810	Val	Glu	Ser	Met	Asn 815	Lys
Glu	Leu	Lys	Lys 820	Ile	Ile	Gly	Gln	Val 825	Arg	Asp	Gln	Ala	Glu 830	His	Leu
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Gln	Asn	Phe	Arg	Val 885	Tyr	Tyr	Arg	Asp	Ser 890	Arg	Asp	Pro	Ile	Trp 895	Lys
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Asp	Asn	Ser 915	Asp	Ile	Lys	Val	Val 920	Pro	Arg	Arg	Lys	Ala 925	Lys	Ile	Ile

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Arg His Ile Ala Arg Glu Leu His Pro Glu Tyr Tyr Lys Asp Cys

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<212> PRT

<213> Human immunodeficiency virus

<400> 24

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Val Leu Glu Glu Ile Asn Leu Pro Gly Lys Trp Lys Pro Lys Met Ile 35 40 45

Gly Gly Ile Gly Gly Phe Ile Lys Val Arg Gln Tyr Asp Gln Ile Leu 50 55 60

Ile Glu Ile Cys Gly Lys Lys Ala Ile Gly Thr Val Leu Val Gly Pro 65 70 75 80

Thr Pro Val Asn Ile Ile Gly Arg Asn Met Leu Thr Gln Leu Gly Cys
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Thr Leu Asn Phe Pro Ile Ser Pro Ile Glu Thr Val Pro Val Lys Leu
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Lys Pro Gly Met Asp Gly Pro Lys Val Lys Gln Trp Pro Leu Thr Glu 115 120 125

Glu Lys Ile Lys Ala Leu Thr Ala Ile Cys Glu Glu Met Glu Lys Glu 130 135 140

Gly Lys Ile Thr Lys Ile Gly Pro Glu Asn Pro Tyr Asn Thr Pro Val 145 150 155 160

Phe Ala Ile Lys Lys Lys Asp Ser Thr Lys Trp Arg Lys Leu Val Asp 165 170 175

Phe Arg Glu Leu Asn Lys Arg Thr Gln Asp Phe Trp Glu Val Gln Leu 180 185 190

Gly Ile Pro His Pro Ala Gly Leu Lys Lys Lys Lys Ser Val Thr Val 195 200 205

Leu Asp Val Gly Asp Ala Tyr Phe Ser Val Pro Leu Asp Glu Gly Phe 210 215 220

Arg Lys Tyr Thr Ala Phe Thr Ile Pro Ser Ile Asn Asn Glu Thr Pro 225 230 235 240

Gly Ile Arg Tyr Gln Tyr Asn Val Leu Pro Gln Gly Trp Lys Gly Ser 245 250 255

Pro Ala Ile Phe Gln Ser Ser Met Thr Lys Ile Leu Glu Pro Phe Arg
260 265 270

Ala Gln Asn Pro Glu Ile Val Ile Tyr Gln Tyr Met Asp Asp Leu Tyr 275 280 285

Val Gly Ser Asp Leu Glu Ile Gly Gln His Arg Ala Lys Ile Glu Glu

290

Leu Arg Glu His Leu Leu Lys Trp Gly Phe Thr Thr Pro Asp Lys Lys His Gln Lys Glu Pro Pro Phe Leu Trp Met Gly Tyr Glu Leu His Pro Asp Lys Trp Thr Val Gln Pro Ile Gln Leu Pro Glu Lys Asp Ser Trp 345 Thr Val Asn Asp Ile Gln Lys Leu Val Gly Lys Leu Asn Trp Ala Ser 360 Gln Ile Tyr Pro Gly Ile Lys Val Arg Gln Leu Cys Lys Leu Leu Arg 375 Gly Ala Lys Ala Leu Thr Asp Ile Val Pro Leu Thr Glu Glu Ala Glu 395 385 Leu Glu Leu Ala Glu Asn Arg Glu Ile Leu Lys Glu Pro Val His Gly Val Tyr Tyr Asp Pro Ser Lys Asp Leu Ile Ala Glu Ile Gln Lys Gln 425 Gly His Asp Gln Trp Thr Tyr Gln Ile Tyr Gln Glu Pro Phe Lys Asn 435 Leu Lys Thr Gly Lys Tyr Ala Lys Met Arg Thr Ala His Thr Asn Asp Val Lys Gln Leu Thr Glu Ala Val Gln Lys Ile Ala Met Glu Ser Ile 475 480 Val Ile Trp Gly Lys Thr Pro Lys Phe Arg Leu Pro Ile Gln Lys Glu 490 Thr Trp Glu Thr Trp Trp Thr Asp Tyr Trp Gln Ala Thr Trp Ile Pro 505 Glu Trp Glu Phe Val Asn Thr Pro Pro Leu Val Lys Leu Trp Tyr Gln 515 Leu Glu Lys Glu Pro Ile Ala Gly Ala Glu Thr Phe Tyr Val Asp Gly 535 Ala Ala Asn Arg Glu Thr Lys Ile Gly Lys Ala Gly Tyr Val Thr Asp 555 Arg Gly Arg Gln Lys Ile Val Ser Leu Thr Glu Thr Thr Asn Gln Lys 565 Thr Glu Leu Gln Ala Ile Gln Leu Ala Leu Gln Asp Ser Gly Ser Glu Val Asn Ile Val Thr Asp Ser Gln Tyr Ala Leu Gly Ile Ile Gln Ala

Gln Pro Asp Lys Ser Glu Ser Glu Leu Val Asn Gln Ile Ile Glu Gln 615 Leu Ile Lys Lys Glu Arg Val Tyr Leu Ser Trp Val Pro Ala His Lys 635 Gly Ile Gly Gly Asn Glu Gln Val Asp Lys Leu Val Ser Ser Gly Ile Arg Lys Val Leu Phe Leu Asp Gly Ile Asp Lys Ala Gln Glu Glu His 665 Glu Lys Tyr His Ser Asn Trp Arg Ala Met Ala Ser Glu Phe Asn Leu 680 Pro Pro Ile Val Ala Lys Glu Ile Val Ala Ser Cys Asp Lys Cys Gln 690 695 Leu Lys Gly Glu Ala Met His Gly Gln Val Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu Gly Lys Ile Ile Leu Val Ala 730 Val His Val Ala Ser Gly Tyr Ile Glu Ala Glu Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Ile Leu Lys Leu Ala Gly Arg Trp Pro Val Lys Val Ile His Thr Asp Asn Gly Ser Asn Phe Thr Ser Ala 770 Ala Val Lys Ala Ala Cys Trp Trp Ala Gly Ile Gln Glu Phe Gly 795 Ile Pro Tyr Asn Pro Gln Ser Gln Gly Val Val Glu Ser Met Asn Lys 810 Glu Leu Lys Lys Ile Ile Gly Gln Val Arg Asp Gln Ala Glu His Leu 820 Lys Thr Ala Val Gln Met Ala Val Phe Ile His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly Glu Arg Ile Ile Asp Ile Ile 855 Ala Thr Asp Ile Gln Thr Lys Glu Leu Gln Lys Gln Ile Ile Lys Ile 865 875 Gln Asn Phe Arg Val Tyr Tyr Arg Asp Ser Arg Asp Pro Ile Trp Lys

Gly Pro Ala Lys Leu Leu Trp Lys Gly Glu Gly Ala Val Val Ile Gln

900 905 910

Asp Asn Ser Asp Ile Lys Val Val Pro Arg Arg Lys Ala Lys Ile Ile 915 925 Lys Asp Tyr Gly Lys Gln Met Ala Gly Ala Asp Cys Val Ala Gly Arg 935 940 Gln Asp Glu Asp 945 <210> 25 <211> 1512 <212> DNA <213> Human immunodeficiency virus <400> 25 gccgccgcca tgggcgcccg cgcctccgtg ctgtccggcg gcgagctgga ccgctgggag 60 aagateegee tgegeeeegg eggeaagaag aagtacaage tgaagcacat egtgtgggee 120 tecegegage tggagegett egeegtgaae eeeggeetge tggagaeete egagggetge 180 cgccagatcc tgggccagct gcagccctcc ctgcagaccg gctccgagga gctgcgctcc 240 ctgtacaaca ccgtggccac cctgtactgc gtgcaccagc gcatcgaggt gaaggacacc 300 aaggaggccc tggagaagat cgaggaggag cagaacaagt ccaagaagaa ggcccagcag 360 geogeogeog acaceggeaa etecteecag gtgteecaga actaececat egtgeagaac 420 ctgcagggcc agatggtgca ccaggccatc tccccccgca ccctgaacgc ctgggtgaag 480 gtggtggagg agaaggcctt ctcccccgag gtgatcccca tgttctccgc cctgtccgag 540 ggcgccaccc cccaggacct gaacaccatg ctgaacaccg tgggcggcca ccaggccgcc 600 atgcagatgc tgaaggagac catcaacgag gaggccgccg agtgggaccg cctgcacccc 660 gtgcacgccg gccccatcgc ccccggccag atgcgcgagc cccgcggctc cgacatcgcc 720 ggcaccacct ccaccctgca ggagcagatc ggctggatga ccaacaaccc ccccatcccc 780 gtgggcgaga tctacaagcg ctggatcatc ctgggcctga acaagatcgt gcgcatgtac 840 tececeacet ceateetgga cateegeeag ggeeceaagg ageeetteeg egactaegtg 900 qaccqcttct acaaqaccct gcgcgccgag caggcctccc aggaggtgaa gaactggatg 960 accqaqaccc tqctqqtqca qaacqccaac cccgactgca agaccatcct gaagqccctg 1020 ggccccgccg ccaccctgga ggagatgatg accgcctgcc agggcgtggg cggccccggc 1080 cacaaggccc gcgtgctggc cgaggccatg tcccaggtga ccaactccgc caccatcatg 1140 atgcagegeg geaactteeg caaceagege aagacegtga agtgetteaa etgeggeaag 1200 gagggccaca tcgccaagaa ctgccgcgcc ccccgcaaga agggctgctg gaagtgcggc 1260 aaggagggcc accagatgaa ggactgcacc gagcgccagg ccaacttcct gggcaagatc 1320 tggccctccc acaagggccg ccccggcaac ttcctgcagt cccgccccga gcccaccgcc 1380 cccccgagg agtccttccg cttcggcgag gagaccacca cccctccca gaagcaggag 1440 cccatcgaca aggagetgta eccettggee tecetgeget ecctgttegg caacgacece 1500 tcctcccagt aa <210> 26 <211> 2562 <212> DNA <213> Human immunodeficiency virus <400> 26 geogeogeca tgegegtgaa gggeateege aagaactace ageacetgtg gegetgggge 60 accatgctgc tgggcatgct gatgatctgc tccgccgccg agaagctgtg ggtgaccgtg 120 tactacqqcq tqcccqtqtg gaaggaggcc accaccaccc tgttctgcgc ctccgacgcc 180 aaqqcctacq acaccgaggt gcacaacgtg tgggccaccc acgcctgcgt gcccaccgac 240 cccaaccccc aggaggtggt gctggagaac gtgaccgaga acttcaacat gtggaagaac 300

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<210> 27
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Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Lys Leu Lys

20

- His Ile Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Val Asn Pro 35 40 45

 Gly Leu Leu Glu Thr Ser Glu Gly Cys Arg Gln Ile Leu Gly Gln Leu
- Gln Pro Ser Leu Gln Thr Gly Ser Glu Glu Leu Arg Ser Leu Tyr Asn 65 70 75 80
- Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Glu Val Lys Asp 85 90 95
- Thr Lys Glu Ala Leu Glu Lys Ile Glu Glu Glu Gln Asn Lys Ser Lys
 100 105 110
- Lys Lys Ala Gln Gln Ala Ala Ala Asp Thr Gly Asn Ser Ser Gln Val 115 120 125
- Ser Gln Asn Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His 130 135 140
- Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser 165 170 175
- Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly
 180 185 190
- Gly His Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu Glu 195 200 205
- Ala Ala Glu Trp Asp Arg Leu His Pro Val His Ala Gly Pro Ile Ala 210 215 220
- Pro Gly Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr 225 230 235 240
- Ser Thr Leu Gln Glu Gln Ile Gly Trp Met Thr Asn Asn Pro Pro Ile 245 250 255
- Pro Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys 260 265 270
- Ile Val Arg Met Tyr Ser Pro Thr Ser Ile Leu Asp Ile Arg Gln Gly 275 280 285
- Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Thr Leu 290 295 300
- Arg Ala Glu Gln Ala Ser Gln Glu Val Lys Asn Trp Met Thr Glu Thr 305 310 315 320
- Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala 325 330 335

Leu Gly Pro Ala Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly 345 Val Gly Gly Pro Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser 360 Gln Val Thr Asn Ser Ala Thr Ile Met Met Gln Arg Gly Asn Phe Arg 370 375 Asn Gln Arg Lys Thr Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His 390 385 Ile Ala Lys Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys 410 Gly Lys Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn 425 Phe Leu Gly Lys Ile Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe Leu Gln Ser Arg Pro Glu Pro Thr Ala Pro Pro Glu Glu Ser Phe Arg 455 Phe Gly Glu Glu Thr Thr Pro Ser Gln Lys Gln Glu Pro Ile Asp 475 465 470 Lys Glu Leu Tyr Pro Leu Ala Ser Leu Arg Ser Leu Phe Gly Asn Asp 485 490 Pro Ser Ser Gln 500 <210> 29 <211> 850 <212> PRT <213> Human immunodeficiency virus <400> 29 Met Arg Val Lys Gly Ile Arg Lys Asn Tyr Gln His Leu Trp Arg Trp Gly Thr Met Leu Gly Met Leu Met Ile Cys Ser Ala Ala Glu Lys 20 Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70

Gln Glu Val Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys

90

85

Asn	Asn	Met	Val 100	Glu	Gln	Met	His	Glu 105	Asp	Ile	Ile	Ser	Leu 110	Trp	Asp	
Gln	Ser	Leu 115	Lys	Pro	Cys	Val	Lys 120	Leu	Thr	Pro	Leu	Cys 125	Val	Thr	Leu	
Asn	Cys 130	Thr	Asp	Leu	Lys	Asn 135	Asn	Leu	Leu	Asn	Thr 140	Asn	Ser	Ser	Ser	
Gly 145	Glu	Lys	Met	Glu	Lys 150	Gly	Glu	Ile	Lys	Asn 155	Cys	Ser	Phe	Asn	Ile 160	
Thr	Thr	Ser	Ile	Arg 165	Asp	Lys	Val	Gln	Lys 170	Glu	Tyr	Ala	Leu	Phe 175	Tyr	
Lys	Leu	Asp	Val 180	Val	Pro	Ile	Asp	Asn 185	Asn	Asn	Asn	Thr	Ser 190	Tyr	Arg	
Leu	Ile	Ser 195	Cys	Asn	Thr	Ser	Val 200	Ile	Thr	Gln	Ala	Cys 205	Pro	Lys	Val	
Ser	Phe 210	Glu	Pro	Ile	Pro	Ile 215	His	Tyr	Cys	Ala	Pro 220	Ala	Gly	Phe	Ala	
Ile 225	Leu	Lys	Cys	Asn	Asp 230	Lys	Lys	Phe	Asn	Gly 235	Thr	Gly	Pro	Cys	Thr 240	
Asn	Val	Ser	Thr	Val 245	Gln	Cys	Thr	His	Gly 250	Ile	Arg	Pro	Val	Val 255	Ser	
Thr	Gln	Leu	Leu 260	Leu	Asn	Gly	Ser	Leu 265	Ala	Glu	Glu	Glu	Val 270	Val	Ile	
Arg	Ser	Glu 275	Asn	Phe	Thr	Asp	Asn 280	Ala	Lys	Thr	Ile	Ile 285	Val	Gln	Leu	
Asn	Glu 290	Ser	Val	Glu	Ile	Asn 295	Cys	Thr	Arg	Pro	Asn 300	Asn	Asn	Thr	Arg	
Lys 305	Ser	Ile	His	Ile	Gly 310	Pro	Gly	Arg	Ala	Phe 315	Tyr	Thr	Thr	Gly	Glu 320	
Ile	Ile	Gly	Asp	Ile 325	Arg	Gln	Ala	His	Cys 330	Asn	Ile	Ser	Arg	Ala 335	Lys	
Trp	Asn	Asn	Thr 340	Leu	Lys	Gln	Ile	Val 345	Lys	Lys	Leu	Arg	Glu 350	Gln	Phe	
Gly	Asn	Lys 355	Thr	Ile	Val	Phe	Asn 360	Gln	Ser	Ser	Gly	Gly 365	Asp	Pro	Glu	
Ile	Val 370	Met	His	Ser	Phe	Asn 375	Cys	Gly	Gly	Glu	Phe 380	Phe	Tyr	Cys	Asn	
Thr 385	Thr	Gln	Leu	Phe	Asn 390	Ser	Thr	Trp	Asn	Asp 395	Asn	Gly	Thr	Trp	Asn 400	

Asn	Thr	Lys	Asp	Lys 405	Asn	Thr	Ile	Thr	Leu 410	Pro	Cys	Arg	Ile	Lys 415	Gln
Ile	Ile	Asn	Met 420	Trp	Gln	Glu	Val	Gly 425	Lys	Ala	Met	Tyr	Ala 430	Pro	Pro
Ile	Arg	Gly 435	Gln	Ile	Arg	Cys	Ser 440	Ser	Asn	Ile	Thr	Gly 445	Leu	Leu	Leu
Thr	Arg 450	Asp	Gly	Gly	Asn	Asn 455	Asn	Asn	Asp	Thr	Glu 460	Ile	Phe	Arg	Pro
Gly 465	Gly	Gly	Asp	Met	Arg 470	Asp	Asn	Trp	Arg	Ser 475	Glu	Leu	Tyr	Lys	Tyr 480
Lys	Val	Val	Lys	Ile 485	Glu	Pro	Leu	Gly	Val 490	Ala	Pro	Thr	Lys	Ala 495	Lys
Arg	Arg	Val	Val 500	Gln	Arg	Glu	Lys	Arg 505	Ala	Val	Gly	Ile	Gly 510	Ala	Met
Phe	Leu	Gly 515	Phe	Leu	Gly	Ala	Ala 520	Gly	Ser	Thr	Met	Gly 525	Ala	Ala	Ser
Met	Thr 530	Leu	Thr	Val	Gln	Ala 535	Arg	Gln	Leu	Leu	Ser 540	Gly	Ile	Val	Gln
Gln 545	Gln	Asn	Asn	Leu	Leu 550	Arg	Ala	Ile	Glu	Ala 555	Gln	Gln	His	Leu	Leu 560
Gln	Leu	Thr	Val	Trp 565	Gly	Ile	Lys	Gln	Leu 570	Gln	Ala	Arg	Val	Leu 575	Ala
Val	Glu	Arg	Tyr 580	Leu	Lys	Asp	Gln	Gln 585	Leu	Leu	Gly	Ile	Trp 590	Gly	Cys
Ser	Gly	Lys 595	Leu	Ile	Сув	Thr	Thr 600	Thr	Val	Pro	Trp	Asn 605	Ala	Ser	Trp
Ser	Asn 610	Lys	Ser	Leu	Asp	Glu 615	Ile	Trp	Asp	Asn	Met 620	Thr	Trp	Met	Glu
Trp 625	Glu	Arg	Glu	Ile	Asp 630	Asn	Tyr	Thr	Ser	Leu 635	Ile	Tyr	Thr	Leu	Ile 640
Glu	Glu	Ser	Gln	Asn 645	Gln	Gln	Glu	Lys	Asn 650	Glu	Gln	Glu	Leu	Leu 655	Glu
Leu	Asp	Lys	Trp 660	Ala	Ser	Leu	Trp	Asn 665	Trp	Phe	Asp	Ile	Thr 670	Asn	Trp
Leu	Trp	Tyr 675	Ile	Lys	Ile	Phe	Ile 680	Met	Ile	Val	Gly	Gly 685	Leu	Ile	Gly
Leu	Arg 690	Ile	Val	Phe	Ala	Val 695	Leu	Ser	Ile	Val	Asn 700	Arg	Val	Arg	Gln

Gly Tyr Ser Pro Leu Ser Phe Gln Thr Arg Leu Pro Ala Pro Arg Gly 705 710 715 720

Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu Gly Gly Glu Arg Asp Arg
725 730 735

Asp Arg Ser Gly Arg Leu Val Asp Gly Phe Leu Ala Leu Ile Trp Asp 740 745 750

Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Leu 755 760 765

Leu Leu Ile Val Thr Arg Ile Val Glu Leu Leu Gly Arg Arg Gly Trp
770 775 780

Glu Val Leu Lys Tyr Trp Trp Asn Leu Leu Gln Tyr Trp Ser Gln Glu 785 790 795 800

Leu Lys Asn Ser Ala Val Ser Leu Leu Asn Ala Thr Ala Ile Ala Val 805 810 815

Ala Glu Gly Thr Asp Arg Val Ile Glu Val Val Gln Arg Ala Cys Arg 820 825 830

Ala Ile Leu His Ile Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala 835 840 845

Leu Leu 850

<210> 30

<211> 610

<212> PRT

<213> Human immunodeficiency virus

<400> 30

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Gly Thr Leu Ile Leu Gly Met Leu Met Ile Cys Ser Ala Ala Glu Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Asn 35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val
50 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn Cys Thr Asn Val Asn Val Thr Asn Thr Thr Asn Asn Thr Glu Glu 135 Lys Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg 155 Asp Lys Lys Gln Lys Val Tyr Ala Leu Phe Tyr Arg Leu Asp Val Val 170 Pro Ile Asp Asp Asn Asn Asn Ser Ser Asn Tyr Arg Leu Ile Asn 185 Cys Asn Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu 205 195 Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys 215 Cys Asn Asp Lys Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser 230 Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Ile Ile Ile Arg Ser Glu 265 Asn Ile Thr Asn Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Glu Ser 275 Val Glu Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile 295 Arg Ile Gly Pro Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly 315 310 Asp Ile Arg Gln Ala His Cys Asn Ile Ser Gly Thr Lys Trp Asn Lys 325 Thr Leu Gln Gln Val Ala Lys Lys Leu Arg Glu His Phe Asn Asn Lys Thr Ile Ile Phe Lys Pro Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr 365 His Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Ser Gly 375 370 Leu Phe Asn Ser Thr Trp Ile Gly Asn Gly Thr Lys Asn Asn Asn Asn 395

Thr Asn Asp Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn

405 410 415

Met Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Glu Gly 420 425 430

Lys Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp 435 440 445

Gly Gly Asn Asn Asn Thr Asn Glu Thr Glu Ile Phe Arg Pro Gly Gly 450 455 460

Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val 465 470 475 480

Val Lys Ile Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Leu Thr 485 490 495

Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn 500 505 510

Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val 515 520 525

Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr 530 540

Leu Lys Asp Gln Gln Leu Glu Ile Trp Asp Asn Met Thr Trp Met Glu 545 550 555 560

Trp Glu Arg Glu Ile Asn Asn Tyr Thr Asp Ile Ile Tyr Ser Leu Ile 565 570 575

Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Ala 580 585 590

Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp
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Leu Trp 610

<210> 31

<211> 1837

<212> DNA

<213> Human immunodeficiency virus

<400> 31

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<210> 32

<211> 841

<212> PRT

<213> Human immunodeficiency virus

<400> 32

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Gly Thr Met Leu Leu Gly Met Leu Met Ile Cys Ser Ala Ala Glu Lys 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr 35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Val Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Leu Met Asn Ala Thr Asn Thr Asn Thr Thr Ile Ile 130 135 140

Tyr 145	Arg	Trp	Arg	Gly	Glu 150	Ile	Lys	Asn	Cys	Ser 155	Phe	Asn	Ile	Thr	Thr 160
Ser	Ile	Arg	Asp	Lys 165	Val	Gln	Lys	Glu	Tyr 170	Ala	Leu	Phe	Tyr	Lys 175	Leu
Asp	Val	Val	Pro 180	Ile	Asp	Asn	Asp	Asn 185	Thr	Ser	Tyr	Arg	Leu 190	Ile	Ser
Cys	Asn	Thr 195	Ser	Val	Ile	Thr	Gln 200	Ala	Cys	Pro	Lys	Val 205	Ser	Phe	Glu
Pro	Ile 210	Pro	Ile	His	Tyr	Cys 215	Ala	Pro	Ala	Gly	Phe 220	Ala	Ile	Leu	Lys
Cys 225	Asn	Asp	Lys	Lys	Phe 230	Asn	Gly	Thr	Gly	Pro 235	Cys	Thr	Asn	Val	Ser 240
Thr	Val	Gln	Cys	Thr 245	His	Gly	Ile	Arg	Pro 250	Val	Val	Ser	Thr	Gln 255	Leu
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Asn	Phe	Thr 275	Asp	Asn	Ala	Lys	Thr 280	Ile	Ile	Val	Gln	Leu 285	Asn	Glu	Ser
Val	Glu 290	Ile	Asn	Cys	Thr	Arg 295	Pro	Asn	Asn	Asn	Thr 300	Arg	Lys	Ser	Ile
His 305	Ile	Gly	Pro	Gly	Arg 310	Ala	Phe	Tyr	Thr	Thr 315	Gly	Glu	Ile	Ile	Gly 320
Asp	Ile	Arg	Gln	Ala 325	His	Cys	Asn	Ile	Ser 330	Arg	Ala	Lys	Trp	Asn 335	Asn
Thr	Leu	Lys	Gln 340	Ile	Val	Lys	Lys	Leu 345	Arg	Glu	Gln	Phe	Gly 350	Asn	Lys
Thr	Ile	Val 355	Phe	Asn	Gln	Ser	Ser 360	Gly	Gly	Asp	Pro	Glu 365	Ile	Val	Met
His	Ser 370	Phe	Asn	Cys	Gly	Gly 375	Glu	Phe	Phe	Tyr	Cys 380	Asn	Thr	Thr	Gln
Leu 385	Phe	Asn	Ser	Thr	Trp 390	Asn	Gly	Thr	Trp	Asn 395	Asn	Thr	Glu	Gly	Asn 400
Ile	Thr	Leu	Pro	Cys 405	Arg	Ile	Lys	Gln	Ile 410	Ile	Asn	Met	Trp	Gln 415	Glu
Val	Gly	Lys	Ala 420	Met	Tyr	Ala	Pro	Pro 425	Ile	Arg	Gly	Gln	Ile 430	Arg	Cys
Ser	Ser	Asn 435	Ile	Thr	Gly	Leu	Leu 440	Leu	Thr	Arg	Asp	Gly 445	Gly	Asn	Asn

Glu	Thr 450	Glu	Ile	Phe	Arg	Pro 455	Gly	Gly	Gly	Asp	Met 460	Arg	Asp	Asn	Trp		
Arg 465	Ser	Glu	Leu	Tyr	Lys 470	Tyr	Lys	Val	Val	Lys 475	Ile	Glu	Pro	Leu	Gly 480		
Val	Ala	Pro	Thr	Lys 485	Ala	Lys	Arg	Arg	Val 490	Val	Gln	Arg	Glu	Lys 495	Arg		
Ala	Val	Gly	Ile 500	Gly	Ala	Met	Phe	Leu 505	Gly	Phe	Leu	Gly	Ala 510	Ala	Gly		
Ser	Thr	Met 515	Gly	Ala	Ala	Ser	Met 520	Thr	Leu	Thr	Val	Gln 525	Ala	Arg	Gln		
Leu	Leu 530	Ser	Gly	Ile	Val	Gln 535	Gln	Gln	Asn	Asn	Leu 540	Leu	Arg	Ala	Ile		
Glu 545	Ala	Gln	Gln	His	Leu 550	Leu	Gln	Leu	Thr	Val 555	Trp	Gly	Ile	Lys	Gln 560		
Leu	Gln	Ala	Arg	Val 565	Leu	Ala	Val	Glu	Arg 570	Tyr	Leu	Lys	Asp	Gln 575	Gln	•	
Leu	Leu	Gly	Ile 580	Trp	Gly	Cys	Ser	Gly 585	Lys	Leu	Ile	Cys	Thr 590	Thr	Ala		
Val	Pro	Trp 595	Asn	Ala	Ser	Trp	Ser 600	Asn	Lys	Ser	Leu	Asp 605	Glu	Ile	Trp		
Asp	Asn 610	Met	Thr	Trp	Met	Glu 615	Trp	Glu	Arg	Glu	Ile 620	Asp	Asn	Tyr	Thr		
Ser 625	Leu	Ile	Tyr	Thr	Leu 630	Ile	Glu	Glu	Ser	Gln 635	Asn	Gln	Gln	Glu	Lys 640		
Asn	Glu	Gln	Glu	Leu 645	Leu	Glu	Leu	Asp	Lys 650	Trp	Ala	Ser	Leu	Trp 655	Asn		
Trp	Phe	Asp	Ile 660	Thr	Asn	Trp	Leu	Trp 665	Tyr	Ile	Lys	Ile	Phe 670	Ile	Met		
Ile	Val	Gly 675	Gly	Leu	Val	Gly	Leu 680	Arg	Ile	Val	Phe	Ala 685	Val	Leu	Ser		
Ile	Val 690	Asn	Arg	Val	Arg	Gln 695	Gly	Tyr	Ser	Pro	Leu 700	Ser	Phe	Gln	Thr		
Arg 705	Leu	Pro	Ala	Pro	Arg 710	Gly	Pro	Asp	Arg	Pro 715	Glu	Gly	Ile	Glu	Glu 720		
Glu	Gly	Gly	Glu	Arg 725	Asp	Arg	Asp	Arg	Ser 730	Gly	Arg	Leu	Val	Asp 735	Gly		
Phe	Leu	Ala	Leu 740	Ile	Trp	Asp	Asp	Leu 745	Arg	Ser	Leu	Cys	Leu 750	Phe	Ser		

Tyr His Arg Leu Arg Asp Leu Leu Leu Ile Val Thr Arg Ile Val Glu
755 760 765

Leu Leu Gly Arg Arg Gly Trp Glu Val Leu Lys Tyr Trp Trp Asn Leu 770 775 780

Leu Gln Tyr Trp Ser Gln Glu Leu Lys Asn Ser Ala Val Ser Leu Leu 785 790 795 800

Asn Ala Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Val Ile Glu 805 810 815

Val Val Gln Arg Ala Cys Arg Ala Ile Leu His Ile Pro Arg Arg Ile 820 825 830

Arg Gln Gly Leu Glu Arg Ala Leu Leu 835 840

<210> 33

<211> 632

<212> PRT

<213> Human immunodeficiency virus

<400> 33

Met Arg Val Lys Gly Ile Arg Lys Asn Tyr Gln His Leu Trp Arg Trp 1 5 10 15

Gly Thr Met Leu Leu Gly Met Leu Met Ile Cys Ser Ala Ala Glu Lys $20 \hspace{1cm} 25 \hspace{1cm} 30$

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Val Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Leu Met Asn Ala Thr Asn Thr Asn Thr Thr Ile Ile 130 135 140

Tyr Arg Trp Arg Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr 145 150 155 160

Ser Ile Arg Asp Lys Val Gln Lys Glu Tyr Ala Leu Phe Tyr Lys Leu 165 170 175

Asp Val	Val Pro		Asn	Asp	Asn 185	Thr	Ser	Tyr	Arg	Leu 190	Ile	Ser
Cys Asn	Thr Ser	Val Ile	. Thr	Gln 200	Ala	Cys	Pro	Lys	Val 205	Ser	Phe	Glu
Pro Ile 210	Pro Ile	His Ty	Cys 215	Ala	Pro	Ala	Gly	Phe 220	Ala	Ile	Leu	Lys
Cys Asn 225	Asp Lys	Lys Phe		Gly	Thr	Gly	Pro 235	Cys	Thr	Asn	Val	Ser 240
Thr Val	Gln Cys	Thr His	Gly	Ile	Arg	Pro 250	Val	Val	Ser	Thr	Gln 255	Leu
Leu Leu	Asn Gly 260		ı Ala	Glu	Glu 265	Glu	Val	Val	Ile	Arg 270	Ser	Glu
Asn Phe	Thr Asp 275	Asn Ala	Lys	Thr 280	Ile	Ile	Val	Gln	Leu 285	Asn	Glu	Ser
Val Glu 290	Ile Asn	Cys Thi	295	Pro	Asn	Asn	Asn	Thr 300	Arg	Lys	Ser	Ile
His Ile	Gly Pro	Gly Arg		Phe	Tyr	Thr	Thr 315	Gly	Glu	Ile	Ile	Gly 320
Asp Ile	Arg Glr	Ala His	Cys	Asn	Ile	Ser 330	Arg	Ala	Lys	Trp	Asn 335	Asn
Thr Leu	Lys Glr 340		Lys	Lys	Leu 345	Arg	Glu	Gln	Phe	Gly 350	Asn	Lys
Thr Ile	Val Phe	Asn Gli	Ser	Ser 360	Gly	Gly	Asp	Pro	Glu 365	Ile	Val	Met
His Ser 370	Phe Asr	Cys Gly	Gly 375	Glu	Phe	Phe	Tyr	Cys 380	Asn	Thr	Thr	Gln
Leu Phe 385	Asn Ser	Thr Trp		Gly	Thr	Trp	Asn 395	Asn	Thr	Glu	Gly	Asn 400
Ile Thr	Leu Pro	Cys Arg	, Ile	Lys	Gln	Ile 410	Ile	Asn	Met	Trp	Gln 415	Glu
Val Gly	Lys Ala 420		Ala	Pro	Pro 425	Ile	Arg	Gly	Gln	Ile 430	Arg	Суѕ
Ser Ser	Asn Ile	Thr Gly	Leu Leu	Leu 440	Leu	Thr	Arg	Asp	Gly 445	Gly	Asn	Asn
Glu Thr 450	Glu Ile	Phe Arg	Pro 455	Gly	Gly	Gly	Asp	Met 460	Arg	Asp	Asn	Trp
Arg Ser 465	Glu Leu	Tyr Lys		Lys	Val	Val	Lys 475	Ile	Glu	Pro	Leu	Gly 480

Val Ala Pro Thr Lys Ala Lys Thr Leu Thr Val Gln Ala Arg Gln Leu 485 490 495

Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu 500 505 510

Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu 515 520 525

Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu 530 540

Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val 545 550 555 560

Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Asp Glu Ile Trp Asp 565 570 575

Asn Met Thr Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr Ser 580 585 590

Leu Ile Tyr Thr Leu Ile Glu Glu Ser Gln Asn Gln Glu Lys Asn 595 600 605

Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp 610 615 620

Phe Asp Ile Thr Asn Trp Leu Trp 625 630

<210> 34

<211> 1927

<212> DNA

<213> Human immunodeficiency virus

<400> 34

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gcgagttett etattgtaac acaacteaac tttttaatag eacttggaat ggaacatgga 1200 acaacacaga agggaacate actetgeett gteggattaa geagateatt aatatgtgge 1260 aagaagtggg aaaagetatg taegeeeege etattegegg acaaataaga tgetetagta 1320 atattacegg attgttgetg acacgegaeg gaggaaataa tgaaacagag atatttagae 1380 etggeggagg egacatgaga gataactgga gaagtgaget ttacaaatat aaagtegtaa 1440 agatagaace attgggggta geaceaacea aageaaaaac ettgacagta eaggetagge 1500 agetgetgag eggaategtg eaacaacaaa ataatettet eegagecata gaageacaac 1560 aacatetgtt geagetgaca gtatggggaa teaaacaget teaggeaaga gtgetggeeg 1620 tegagagata eeteaaagat eaacaactge tgggeatatg gggatgttee ggtaaactea 1680 tatgeacaca egeetggeeg gaatgggaac eggaacacae eggaacacae ggggaaatet eggaacaga gggaaattg eaactataet agtttgattt 1800 atacetetgat ggeateattg tggaacega eggaaaata egaacaggaa etgetggaec 1920 etaaaa
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<210> 35
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<211> 829

<212> PRT

<213> Human immunodeficiency virus

<400> 35

Met Arg Val Met Gly Ile Gln Arg Asn Cys Gln His Leu Trp Arg Trp

1 10 15

Gly Ile Leu Ile Phe Gly Met Leu Ile Ile Cys Ser Ala Ala Glu Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Asn
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Val Asn Ala Thr Asn Asn Thr Thr Asn Asn Glu Glu
130 140

Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp Lys Lys 145 150 155 160

Lys Lys Val Tyr Ala Leu Phe Tyr Lys Leu Asp Val Val Pro Ile Asp 165 170 175

Asp Asn Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr 180 185 190

Gln Ala Cys	-	Val Ser	Phe 200	Glu	Pro	Ile	Pro	Ile 205	His	Tyr	Cys
Ala Pro Ala 210	Gly Phe	Ala Ile 215		Lys	Cys	Asn	Asp 220	Lys	Lys	Phe	Asn
Gly Thr Gly 225	Pro Cys	Lys Asn 230	Val	Ser	Thr	Val 235	Gln	Cys	Thr	His	Gly 240
Ile Lys Pro	Val Val 245	Ser Thr	Gln	Leu	Leu 250	Leu	Asn	Gly	Ser	Leu 255	Ala
Glu Glu Glu	Ile Ile 260	Ile Arg	Ser	Glu 265	Asn	Ile	Thr	Asn	Asn 270	Ala	Lys
Thr Ile Ile 275		Leu Asn	Glu 280	Ser	Val	Glu	Ile	Asn 285	Cys	Thr	Arg
Pro Asn Asn 290	Asn Thr	Arg Lys 295		Ile	Arg	Ile	Gly 300	Pro	Gly	Gln	Ala
Phe Tyr Ala 305	Thr Gly	Asp Ile	Ile	Gly	Asp	Ile 315	Arg	Gln	Ala	His	Cys 320
Asn Ile Ser	Arg Thr 325		Asn	Lys	Thr 330	Leu	Gln	Gln	Val	Ala 335	Lys
Lys Leu Arg	Glu His 340	Phe Asn	Lys	Thr 345	Ile	Ile	Phe	Asn	Pro 350	Ser	Ser
Gly Gly Asp 355		Ile Thr	Thr 360	His	Ser	Phe	Asn	Cys 365	Gly	Gly	Glu
Phe Phe Tyr 370	Cys Asn	Thr Ser		Leu	Phe	Asn	Ser 380	Thr	Trp	Asn	Gly
Thr Asn Asn 385	Thr Ile	Thr Leu 390	Pro	Cys	Arg	Ile 395	Lys	Gln	Ile	Ile	Asn 400
Met Trp Glr	Gly Val 405	-	Ala	Met	Tyr 410	Ala	Pro	Pro	Ile	Glu 415	Gly
Lys Ile Arg	Cys Thr 420	Ser Asn	Ile	Thr 425	Gly	Leu	Leu	Leu	Thr 430	Arg	Asp
Gly Gly Asr 435		Thr Glu	Thr 440	Phe	Arg	Pro	Gly	Gly 445	Gly	Asp	Met
Arg Asp Asr 450	Trp Arg	Ser Glu 455		Tyr	Lys	Tyr	Lys 460	Val	Val	Lys	Ile
Glu Pro Leu 465	Gly Val	Ala Pro 470	Thr	Lys	Ala	Lys 475	Arg	Arg	Val	Val	Glu 480
Arg Glu Lys	arg Ala 485		Ile	Gly	Ala 490	Val	Phe	Leu	Gly	Phe 495	Leu

- Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val 500 505 510
- Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu 515 520 525
- Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp 530 540
- Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu 545 550 555 560
- Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile 565 570 575
- Cys Thr Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Gln
 580 585 590
- Asp Glu Ile Trp Asp Asn Met Thr Trp Met Glu Trp Asp Lys Glu Ile
 595 600 605
- Asn Asn Tyr Thr Asp Ile Ile Tyr Ser Leu Ile Glu Glu Ser Gln Asn 610 615 620
- Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Ala Leu Asp Lys Trp Ala 625 630 635 640
- Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys
 645 650 655
- Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val Phe 660 665 670
- Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu 675 680 685
- Ser Phe Gln Thr Leu Ile Pro Asn Pro Arg Gly Pro Asp Arg Pro Glu 690 695 700
- Gly Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile Arg 705 710 715 720
- Leu Val Asn Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg Ser Leu 725 730 735
- Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Leu Ile Leu Ile Ala Ala 740 745 750
- Arg Thr Val Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr 755 760 765
- Leu Trp Asn Leu Leu Gln Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala
 770 780
- Ile Ser Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Glu Gly Thr Asp 785 790 795 800

Arg Val Ile Glu Val Val Gln Arg Val Cys Arg Ala Ile Leu Asn Ile 805 810 815

Pro Arg Arg Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu 820 825

<210> 36

<211> 620

<212> PRT

<213> Human immunodeficiency virus

<400> 36

Met Arg Val Met Gly Ile Gln Arg Asn Cys Gln His Leu Trp Arg Trp

1 10 15

Gly Ile Leu Ile Phe Gly Met Leu Ile Ile Cys Ser Ala Ala Glu Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Asn
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Val Asn Ala Thr Asn Asn Thr Thr Asn Asn Glu Glu 130 135 140

Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp Lys Lys 145 150 155 160

Lys Lys Val Tyr Ala Leu Phe Tyr Lys Leu Asp Val Val Pro Ile Asp 165 170 175

Asp Asn Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr 180 185 190

Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys 195 200 205

Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe Asn 210 215 220

Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys Thr His Gly

Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala 245 250 255

Glu Glu Glu Ile Ile Ile Arg Ser Glu Asn Ile Thr Asn Asn Ala Lys 260 265 270

Thr Ile Ile Val Gln Leu Asn Glu Ser Val Glu Ile Asn Cys Thr Arg 275 280 285

Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Ala 290 295 300

Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys 305 310 315

Asn Ile Ser Arg Thr Lys Trp Asn Lys Thr Leu Gln Gln Val Ala Lys 325 330 335

Lys Leu Arg Glu His Phe Asn Lys Thr Ile Ile Phe Asn Pro Ser Ser 340 345 350

Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly Gly Glu 355 360 365

Phe Phe Tyr Cys Asn Thr Ser Glu Leu Phe Asn Ser Thr Trp Asn Gly 370 375 380

Thr Asn Asn Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn 385 390 395 400

Met Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Glu Gly
405 410 415

Lys Ile Arg Cys Thr Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp 420 425 430

Gly Gly Asn Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Gly Asp Met 435 440 445

Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile 450 455 460

Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Thr Leu Thr Val Gln 465 470 475 480

Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Ser Asn Leu Leu 485 490 495

Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly 500 505 510

Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys 515 520 525

Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys

530 535 540

Thr Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Gln Asp 545

Glu Ile Trp Asp Asn Met Thr Trp Met Glu Trp Asp Lys Glu Ile Asn 575

Asn Tyr Thr Asp Ile Ile Tyr Ser Leu Ile Glu Glu Ser Gln Asn Gln 590

Gln Glu Lys Asn Glu Gln Glu Leu Leu Ala Leu Asp Lys Trp Ala Ser 595 600 605

Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp 610 620

<210> 37 <211> 1891 <212> DNA <213> Human immunodeficiency virus

<400> 37

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<210> 38
<211> 845
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<212> PRT

<213> Human immunodeficiency virus

<400> 38

Met Arg Val Met Gly Ile Gln Arg Asn Cys Gln His Leu Leu Arg Trp

Gly Thr Met Ile Leu Gly Met Ile Ile Cys Ser Ala Ala Glu Asn

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Asp Ala Glu

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Met

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro

Gln Glu Ile His Leu Glu Asn Val Thr Glu Glu Phe Asn Met Trp Lys

Asn Asn Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp 105

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 120

Asn Cys Ser Asn Val Asn Val Thr Asn Asn Thr Thr Asn Thr His Glu 135

Glu Glu Ile Lys Asn Cys Ser Phe Asn Met Thr Thr Glu Leu Arg Asp 150 155

Lys Lys Gln Lys Val Tyr Ser Leu Phe Tyr Arg Leu Asp Val Val Gln 165

Ile Asn Glu Asn Asn Ser Asn Ser Ser Tyr Arg Leu Ile Asn Cys Asn

Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile 195

Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Lys

Asp Lys Glu Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val 230 235

Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu 245

Asn Gly Ser Leu Ala Glu Glu Glu Val Ile Ile Arg Ser Glu Asn Ile 265 270 260

Thr	Asn	Asn 275	Ala	Lys	Thr	Ile	Ile 280	Val	Gln	Leu	Thr	Lys 285	Pro	Val	Lys
Ile	Asn 290	Cys	Thr	Arg	Pro	Asn 295	Asn	Asn	Thr	Arg	Lys 300	Ser	Ile	Arg	Ile
Gly 305	Pro	Gly	Gln	Ala	Phe 310	Tyr	Ala	Thr	Gly	Asp 315	Ile	Ile	Gly	Asp	Ile 320
Arg	Gln	Ala	His	Cys 325	Asn	Val	Ser	Arg	Ser 330	Glu	Trp	Asn	Lys	Thr 335	Leu
Gln	Lys	Val	Ala 340	Lys	Gln	Leu	Arg	Lys 345	Tyr	Phe	Lys	Asn	Lys 350	Thr	Ile
Ile	Phe	Thr 355	Asn	Ser	Ser	Gly	Gly 360	Asp	Leu	Glu	Ile	Thr 365	Thr	His	Ser
Phe	Asn 370	Cys	Gly	Gly	Glu	Phe 375	Phe	Tyr	Cys	Asn	Thr 380	Ser	Gly	Leu	Phe
Asn 385	Ser	Thr	Trp	Asn	Asn 390	Gly	Thr	Met	Lys	Asn 395	Thr	Ile	Thr	Leu	Pro 400
Cys	Arg	Ile	Lys	Gln 405	Ile	Ile	Asn	Met	Trp 410	Gln	Arg	Ala	Gly	Gln 415	Ala
Met	Tyr	Ala	Pro 420	Pro	Ile	Gln	Gly	Val 425	Ile	Arg	Cys	Glu	Ser 430	Asn	Ile
Thr	Gly	Leu 435	Leu	Leu	Thr	Arg	Asp 440	Gly	Gly	Asn	Asn	Asn 445	Thr	Asn	Glu
Thr	Phe 450	Arg	Pro	Gly	Gly	Gly 455	Asp	Met	Arg	Asp	Asn 460	Trp	Arg	Ser	Glu
Leu 465	Tyr	Lys	Tyr	Lys	Val 470	Val	Lys	Ile	Glu	Pro 475	Leu	Gly	Val	Ala	Pro 480
Thr	Arg	Ala	Lys	Arg [.] 485	Arg	Val	Val	Glu	Arg 490	Glu	Lys	Arg	Ala	Val 495	Gly
Ile	Gly	Ala	Val 500	Phe	Leu	Gly	Phe	Leu 505	Gly	Ala	Ala	Gly	Ser 510	Thr	Met
Gly	Ala	Ala 515	Ser	Ile	Thr	Leu	Thr 520	Val	Gln	Ala	Arg	Gln 525	Leu	Leu	Ser
Gly	Ile 530	Val	Gln	Gln	Gln	Ser 535	Asn	Leu	Leu	Arg	Ala 540	Ile	Glu	Ala	Gln
Gln 545	His	Leu	Leu	Lys	Leu 550	Thr	Val	Trp	Gly	Ile 555	Lys	Gln	Leu	Gln	Ala 560
Arg	Val	Leu	Ala	Val 565	Glu	Arg	Tyr	Leu	Lys 570	Asp	Gln	Gln	Leu	Leu 575	Gly

Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro Trp 580 585 590

Asn Ser Ser Trp Ser Asn Lys Ser Gln Asn Glu Ile Trp Asp Asn Met
595 600 605

Thr Trp Leu Gln Trp Asp Lys Glu Ile Ser Asn Tyr Thr His Ile Ile 610 615 620

Tyr Asn Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln 625 630 635 640

Asp Leu Leu Ala Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp Phe Asp 645 650 655

Ile Ser Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly
660 665 670

Gly Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Ser Val Ile Asn 675 680 685

Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr His Thr Pro 690 695 700

Asn Pro Arg Gly Leu Asp Arg Pro Gly Arg Ile Glu Glu Glu Gly Gly 705 710 715 720

Glu Gln Gly Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala
725 730 735

Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg
740 745 750

Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly 755 760 765

His Ser Ser Leu Lys Gly Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr
770 775 780

Leu Trp Asn Leu Leu Tyr Trp Gly Arg Glu Leu Lys Ile Ser Ala
785 790 795 800

Ile Asn Leu Val Asp Thr Ile Ala Ile Ala Val Ala Gly Trp Thr Asp 805 810 815

Arg Val Ile Glu Ile Gly Gln Arg Ile Gly Arg Ala Ile Leu His Ile 820 825 830

Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu 835 840 845

<210> 39

<211> 629

<212> PRT

<213> Human immunodeficiency virus

<400> 39

Met Arg Val Met Gly Ile Gln Arg Asn Cys Gln His Leu Leu Arg Trp

1 10 15

Gly Thr Met Ile Leu Gly Met Ile Ile Ile Cys Ser Ala Ala Glu Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Asp Ala Glu 35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Met 50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile His Leu Glu Asn Val Thr Glu Glu Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Ser Asn Val Asn Val Thr Asn Asn Thr Thr Asn Thr His Glu
130 135 140

Glu Glu Ile Lys Asn Cys Ser Phe Asn Met Thr Thr Glu Leu Arg Asp 145 150 155 160

Lys Lys Gln Lys Val Tyr Ser Leu Phe Tyr Arg Leu Asp Val Val Gln
165 170 175

Ile Asn Glu Asn Asn Ser Asn Ser Ser Tyr Arg Leu Ile Asn Cys Asn 180 185 190

Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile 195 200 205

Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Lys 210 215 220

Asp Lys Glu Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val 225 230 235 240

Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu 245 250 255

Asn Gly Ser Leu Ala Glu Glu Glu Val Ile Ile Arg Ser Glu Asn Ile 260 265 270

Thr Asn Asn Ala Lys Thr Ile Ile Val Gln Leu Thr Lys Pro Val Lys 275 280 285

Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile

290

Gly Pro Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile 315 310 Arg Gln Ala His Cys Asn Val Ser Arg Ser Glu Trp Asn Lys Thr Leu 325 Gln Lys Val Ala Lys Gln Leu Arg Lys Tyr Phe Lys Asn Lys Thr Ile 345 Ile Phe Thr Asn Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Gly Leu Phe 375 Asn Ser Thr Trp Asn Asn Gly Thr Met Lys Asn Thr Ile Thr Leu Pro 395 390 Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Arg Ala Gly Gln Ala 410 405 Met Tyr Ala Pro Pro Ile Gln Gly Val Ile Arg Cys Glu Ser Asn Ile 425 Thr Gly Leu Leu Thr Arg Asp Gly Gly Asn Asn Asn Thr Asn Glu 435 Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala Pro 475 470 Thr Arg Ala Lys Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly 485 Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln 505 His Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg 515 Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro Trp Asn 555 Ser Ser Trp Ser Asn Lys Ser Gln Asn Glu Ile Trp Asp Asn Met Thr 565 570 Trp Leu Gln Trp Asp Lys Glu Ile Ser Asn Tyr Thr His Ile Ile Tyr 585 Asn Leu Ile Glu Glu Ser Gln Asn Gln Glu Lys Asn Glu Gln Asp

595 600 605

Leu Leu Ala Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp Phe Asp Ile 610 615 Ser Asn Trp Leu Trp 625 <210> 40 <211> 1918 <212> DNA <213> Human immunodeficiency virus <400> 40 ttcagtcgac agccaccatg agggtgatgg gaatccaacg gaactgccag catcttctcc 60 qqtqqqqaac qatqatactq qqaatqataa taatctgctc tgccgctgaa aacctctggg 120 tcacagtgta ctacggagtg cctgtatgga aggacgctga aaccactctc ttttgtgctt 180 ccqatqctaa aqcctacqaa accqaqatqc acaatqtttq ggccacccac gcctgcgtgc 240 caactgatcc taatccacaa gaaatacatc tggagaatgt tactgaggaa tttaacatgt 300 ggaaaaataa tatggtagag caaatgcaca ctgacatcat ttcactctgg gaccaatcac 360 tcaaaccctg cgttaaactt accccctct gcgtgaccct caattgtagc aacgtcaacg 420 tcacaaataa tacaaccaac actcacgagg aagaaattaa aaattgctcc tttaatatga 480 ccactgaact tcgcgacaaa aaacaaaaag tctattcact gttttatagg ctggacgtcg 540 tccaaatcaa cgagaacaat tctaacagta gctatcgact tatcaattgc aatacctctg 600 ctattaccca agettqtcct aaagtetett ttgaaccaat ccctatccac tactgtgccc 660 cagctggatt cgcaattctg aagtgcaagg ataaggaatt caacggaact ggcccttgca 720 agaacgttag cactgtccaa tgcactcacg gaatcaaacc agtagtcagc actcaactgc 780 tcctgaatgg ctcactcgcc gaagaagagg tgattatccg aagcgagaac ataactaaca 840 atgcgaagac aataattgtt caattgacga aaccagtgaa gatcaactgt actagaccaa 900 ataacaacac aagaaaatct atcagaattg gccccggaca agccttctac gcaacaggag 960 atatcatagg tgacatcaga caggcccatt gcaacgtttc aagaagcgag tggaataaaa 1020 cactccagaa agtggcaaag cagctgagaa aatactttaa gaacaagaca atcatattta 1080 ctaactcctc cggaggtgat ctcgaaataa ccactcatag ctttaattgt gggggcgaat 1140 tettetactg taacacatet ggeetettta attetacetg gaataacgge accatgaaaa 1200 atactatcac cctcccttgc agaattaagc aaatcattaa catgtggcag agagcaggac 1260 aggccatgta tgcccctccc attcaaggtg tgattcgatg tgaaagcaac attactggac 1320 ttcttctqac ccqqqatqqc qqaaataata ataccaatga gacattcaga cccggcggcg 1380 gcgatatgcg agacaattgg cgaagtgaac tttataaata caaagtagtt aagattgagc 1440 cccttggagt tgcccctact agagcaaaaa cattgaccgt tcaggccagg cagctgctct 1500 caggaatcgt gcagcagcaa agtaacctcc tccgagctat cgaggcacaa caacatctct 1560 tgaaattgac cgtatgggga atcaagcaat tgcaggctag ggttttggct gtggaacgct 1620 atctcaagga tcagcagctt ctgggaatct ggggatgctc tgggaaattg atatgtacta 1680 caaacgtacc ctggaactca agctggagta ataaaagcca gaacgaaatt tgggataata 1740 tcgaagaatc acagaaccag caggaaaaga atgagcaaga ccttctggcc ttggacaagt 1860 gggctaactt gtggaactgg tttgacatta gcaactggct gtggtaaaga tcttacaa <210> 41 <211> 835 <212> PRT <213> Human immunodeficiency virus <400> 41 Met Arg Val Arg Gly Ile Leu Arg Asn Cys Gln Gln Trp Trp Ile Trp

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- Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys
 35 40 45
- Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Lys Glu Val
 50 55 60
- His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80
- Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95
- Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110
- Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125
- Asn Cys Thr Asn Ala Thr Asn Ala Thr Asn Thr Met Gly Glu Ile Lys
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- Asn Cys Ser Phe Asn Ile Thr Thr Glu Leu Arg Asp Lys Lys Gln Lys 145 150 155 160
- Val Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn Glu Asn 165 170 175
- Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala 180 185 190
- Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr Cys Ala Pro 195 200 205
- Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr 210 215 220
- Gly Pro Cys Asn Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys 225 230 235 240
- Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu 245 250 255
- Glu Ile Ile Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile 260 265 270
- Ile Val His Leu Asn Glu Ser Val Glu Ile Val Cys Thr Arg Pro Asn 275 280 285
- Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Thr Phe Tyr 290 295 300
- Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile 305 310 315 320

- Ser Glu Asp Lys Trp Asn Lys Thr Leu Gln Lys Val Ser Lys Leu 325 330 335
- Lys Glu His Phe Pro Asn Lys Thr Ile Lys Phe Glu Pro Ser Ser Gly 340 345 350
- Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Arg Gly Glu Phe 355 360 365
- Phe Tyr Cys Asn Thr Ser Lys Leu Phe Asn Ser Thr Tyr Asn Ser Thr 370 375 380
- Asn Ser Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met 385 390 395 400
- Trp Gln Glu Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn 405 410 415
- Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu Leu Thr Arg Asp Gly
 420 425 430
- Gly Lys Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg
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- Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu Ile Lys 450 455 460
- Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Glu Arg 465 470 475 480
- Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly
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- Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln 500 505 510
- Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu 515 520 525
- Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr Val Trp Gly 530 540
- Ile Lys Gln Leu Gln Thr Arg Val Leu Ala Ile Glu Arg Tyr Leu Lys 545 550 555 560
- Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys 565 570 575
- Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Gln Glu 580 585 590
- Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu Ile Ser 595 600 605
- Asn Tyr Thr Asp Thr Ile Tyr Arg Leu Leu Glu Asp Ser Gln Asn Gln 610 620

Gln Glu Lys Asn Glu Lys Asp Leu Leu Ala Leu Asp Ser Trp Lys Asn Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile 650 Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser 680 Phe Gln Thr Leu Thr Pro Asn Pro Arg Gly Pro Asp Arg Leu Gly Arg 690 Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile Arg Leu 715 Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys 725 730 Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg 745 740 Ala Val Glu Leu Leu Gly Arg Ser Ser Leu Arg Gly Leu Gln Arg Gly Trp Glu Ala Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr Trp Gly Leu 770 Glu Leu Lys Lys Ser Ala Ile Ser Leu Leu Asp Thr Ile Ala Ile Ala 795 Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Leu Ile Gln Arg Ile Cys 810 Arg Ala Ile Arg Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Ala 825 830 820 Ala Leu Gln 835 <210> 42 <211> 619 <212> PRT <213> Human immunodeficiency virus

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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Lys Glu Val 50

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys

Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 105

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 120

Asn Cys Thr Asn Ala Thr Asn Ala Thr Asn Thr Met Gly Glu Ile Lys 135 130

Asn Cys Ser Phe Asn Ile Thr Thr Glu Leu Arg Asp Lys Lys Gln Lys 150 155

Val Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn Glu Asn 170

Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala

Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr Cys Ala Pro

Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr

Gly Pro Cys Asn Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys

Pro Val Val Ser Thr Gln Leu Leu Asn Gly Ser Leu Ala Glu Glu 250

Glu Ile Ile Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile 260

Ile Val His Leu Asn Glu Ser Val Glu Ile Val Cys Thr Arg Pro Asn

Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Thr Phe Tyr 295

Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile 305 315

Ser Glu Asp Lys Trp Asn Lys Thr Leu Gln Lys Val Ser Lys Lys Leu

Lys Glu His Phe Pro Asn Lys Thr Ile Lys Phe Glu Pro Ser Ser Gly

340 345 350

Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Arg Gly Glu Phe 355 360 365

Phe Tyr Cys Asn Thr Ser Lys Leu Phe Asn Ser Thr Tyr Asn Ser Thr 370 375 380

Asn Ser Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met 385 390 395 400

Trp Gln Glu Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn 405 410 415

Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly
420 425 430

Gly Lys Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg 435 440 445

Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu Ile Lys 450 455

Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys Thr Leu Thr Val Gln Ala 465 470 475 480

Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg 485 490 495

Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr Val Trp Gly Ile 500 505 510

Lys Gln Leu Gln Thr Arg Val Leu Ala Ile Glu Arg Tyr Leu Lys Asp 515 520 525

Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr 530 535 540

Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Gln Glu Asp 545 550 555 560

Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu Ile Ser Asn 565 570 575

Tyr Thr Asp Thr Ile Tyr Arg Leu Leu Glu Asp Ser Gln Asn Gln Gln 580 585 590

Glu Lys Asn Glu Lys Asp Leu Leu Ala Leu Asp Ser Trp Lys Asn Leu 595 600 605

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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Glu Asp Ala Asp
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Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Ser Thr Glu Arg
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His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
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 65
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1888

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Asn	Cys 130	Thr	Asp	Val	Asn	Val 135	Thr	Asn	Asn	Asn	Thr 140	Asn	Asn	Thr	Lys
Lys 145	Glu	Ile	Lys	Asn	Cys 150	Ser	Phe	Asn	Ile	Thr 155	Thr	Glu	Ile	Arg	Asp 160
Lys	Lys	Lys	Lys	Glu 165	Tyr	Ala	Leu	Phe	Tyr 170	Arg	Leu	Asp	Val	Val 175	Pro
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Val	Ser	Thr 195	Ile	Lys	Gln	Ala	Cys 200	Pro	Lys	Val	Thr	Phe 205	Asp	Pro	Ile
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Gln	Cys	Thr	His	Gly 245	Ile	Lys	Pro	Val	Val 250	Ser	Thr	Gln	Leu	Leu 255	Leu
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Ile	Asn 290	Суѕ	Thr	Arg	Pro	Asn 295	Asn	Asn	Thr	Arg	Lys	Ser	Ile	Arg	Ile
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Arg	Gln	Ala	His	Cys 325	Asn	Val	Ser	Arg	Thr 330	Lys	Trp	Asn	Glu	Met 335	Leu
Gln	Lys	Val	Lys 340	Ala	Gln	Leu	Lys	Lys 345	Ile	Phe	Asn	Lys	Ser 350	Ile	Thr
Phe	Asn	Ser 355	Ser	Ser	Gly	Gly	Asp 360	Leu	Glu	Ile	Thr	Thr 365	His	Ser	Phe
Asn	Cys 370	Arg	Gly	Glu	Phe	Phe 375	Tyr	Cys	Asn	Thr	Ser 380	Gly	Leu	Phe	Asn

Asn Ser Leu Leu Asn Ser Thr Asn Ser Thr Ile Thr Leu Pro Cys Lys Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Arg Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn Asn Thr Glu Thr Phe Arg 440 Pro Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Ile Val Lys Ile Lys Pro Leu Gly Val Ala Pro Thr Arg Ala 475 Arg Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Leu Gly Ala 490 485 Val Leu Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala 500 505 Ser Ile Thr Leu Thr Val Gln Val Arg Gln Leu Leu Ser Gly Ile Val 520 Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu 535 530 Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu 545 555 Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly 570 Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro Trp Asn Thr Ser 580 585 Trp Ser Asn Lys Ser Tyr Asn Glu Ile Trp Asp Asn Met Thr Trp Ile 600 Glu Trp Glu Arg Glu Ile Ser Asn Tyr Thr Gln Gln Ile Tyr Ser Leu 615 610 Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu 625 Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Lys 650 Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg 680 685 675

Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr His His Gln Arg
690 695 700

Glu Pro Asp Arg Pro Glu Arg Ile Glu Glu Gly Gly Gly Glu Gln Asp 705 710 715 720

Lys Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp
725 730 735

Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp
740 745 750

Phe Ile Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly Arg Ser Ser 755 760 765

Leu Lys Gly Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr Leu Trp Asn
770 780

Leu Leu Leu Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala Ile Asn Leu 785 790 795 800

Leu Asp Thr Ile Ala Ile Ala Val Ala Asn Trp Thr Asp Arg Val Ile 805 . 810 815

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Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu 835 840

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<212> PRT

<213> Human immunodeficiency virus

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35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Ser Thr Glu Arg
50 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Thr Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp

Glu Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 Asn Cys Thr Asp Val Asn Val Thr Asn Asn Thr Asn Asn Thr Lys Lys Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp 155 Lys Lys Lys Glu Tyr Ala Leu Phe Tyr Arg Leu Asp Val Val Pro Ile Asn Asp Asn Gly Asn Ser Ser Ile Tyr Arg Leu Ile Asn Cys Asn 185 Val Ser Thr Ile Lys Gln Ala Cys Pro Lys Val Thr Phe Asp Pro Ile 195 Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Arg Asp Lys Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val 235 230 Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Arg Ser Glu Asn Ile Thr Asp Asn Thr Lys Val Ile Ile Val Gln Leu Asn Glu Thr Ile Glu 275 285 Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile 295 Gly Pro Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile 310 315 Arg Gln Ala His Cys Asn Val Ser Arg Thr Lys Trp Asn Glu Met Leu 325 Gln Lys Val Lys Ala Gln Leu Lys Lys Ile Phe Asn Lys Ser Ile Thr Phe Asn Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Ser Gly Leu Phe Asn 370 Asn Ser Leu Leu Asn Ser Thr Asn Ser Thr Ile Thr Leu Pro Cys Lys 395

Ile Lys Gln Ile Val Arg Met Trp Gln Arg Val Gly Gln Ala Met Tyr

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Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Arg Ser Asn Ile Thr Gly
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Leu Leu Thr Arg Asp Gly Gly Asn Asn Asn Thr Glu Thr Phe Arg
435 440 445

Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys 450 455 460

Tyr Lys Ile Val Lys Ile Lys Pro Leu Gly Val Ala Pro Thr Arg Ala 465 470 475 480

Arg Thr Leu Thr Val Gln Val Arg Gln Leu Leu Ser Gly Ile Val Gln 485 490 495

Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu 500 505 510

Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala 515 520 525

Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys 530 540

Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro Trp Asn Thr Ser Trp 545 550 555 560

Ser Asn Lys Ser Tyr Asn Glu Ile Trp Asp Asn Met Thr Trp Ile Glu 565 570 575

Trp Glu Arg Glu Ile Ser Asn Tyr Thr Gln Gln Ile Tyr Ser Leu Ile 580 585 590

Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala 595 600 605

Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Lys Trp 610 615 620

Leu Trp 625

<210> 46

<211> 1909

<212> DNA

<213> Human immunodeficiency virus

<400> 46

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tgaaaccttg cgtgaagctt acaccactgt gcgttaccct gaattgcact gacgtcaatg 420
tcacaaataa taataccaac aatacaaaaa aagaaatcaa aaattgttct ttcaacataa 480
ccaccgagat acgcgataaa aaaaagaaag aatacgccct gttctacaga ctcgatgtgg 540
tcccaattaa tgacaacgga aattcttcca tctaccgact tatcaattgt aacgtgtcta 600
caatcaaaca ggcctgtcct aaagtcacat ttgaccctat tcccattcat tactgtgccc 660
ccgctggctt cgctattctt aaatgccgag acaaaaaatt taacggaaca ggaccatgca 720
agaatgtctc aacagttcaa tgcactcatg gaattaaacc agtcgtttct actcaactcc 780
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ataataacac aagaaaaagc atacgcatcg gccccggaca ggctttctac gccacaggag 960
acattatcgg agatatccgc caggctcact gtaatgtgtc tagaacaaaa tggaacgaaa 1020
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tcgaatggga gcgcgaaata tccaactata ctcagcaaat ctattccctc attgaagaga 1800
gtcagaacca gcaggaaaag aatgagcaag acctcctcgc cctggataaa tgggcatctc 1860
                                                                  1909
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<210> 47
<211> 854
<212> PRT
<213> Human immunodeficiency virus
<400> 47
Met Arg Val Lys Glu Thr Gln Met Asn Trp Pro Asn Leu Trp Lys Trp
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Gly Thr Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Ser Asp Asn
             20
Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Asp
                              40
Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala His Glu Thr Glu Val
                         55
     50
His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
                                          75
Gln Glu Ile His Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
                                                          95
Asn Asn Met Val Glu Gln Met Gln Glu Asp Val Ile Ser Leu Trp Asp
            100
Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
                                                 125
        115
                             120
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Asn	Cys 130	Thr	Asn	Ala	Asn	Leu 135	Thr	Asn	Val	Asn	Asn 140	Ile	Thr	Asn	Val
Ser 145	Asn	Ile	Ile	Gly	Asn 150	Ile	Thr	Asn	Glu	Val 155	Arg	Asn	Cys	Ser	Phe 160
Asn	Met	Thr	Thr	Glu 165	Leu	Arg	Asp	Lys	Lys 170	Gln	Lys	Val	His	Ala 175	Leu
Phe	Tyr	Lys	Leu 180	Asp	Ile	Val	Gln	Ile 185	Glu	Asp	Asn	Asn	Ser 190	Tyr	Arg
Leu	Ile	Asn 195	Cys	Asn	Thr	Ser	Val 200	Ile	Lys	Gln	Ala	Cys 205	Pro	Lys	Ile
Ser	Phe 210	Asp	Pro	Ile	Pro	Ile 215	His	Tyr	Cys	Thr	Pro 220	Ala	Gly	Tyr	Ala
Ile 225	Leu	Lys	Cys	Asn	Asp 230	Lys	Asn	Phe	Asn	Gly 235	Thr	Gly	Pro	Cys	Lys 240
Asn	Val	Ser	Ser	Val 245	Gln	Cys	Thr	His	Gly 250	Ile	Lys	Pro	Val	Val 255	Ser
Thr	Gln	Leu	Leu 260	Leu	Asn	Gly	Ser	Leu 265	Ala	Glu	Glu	Glu	Ile 270	Ile	Ile
Arg	Ser	Glu 275	Asn	Leu	Thr	Asn	Asn 280	Ala	Lys	Thr	Ile	Ile 285	Val	His	Leu
Asn	Lys 290	Ser	Val	Glu	Ile	Asn 295	Cys	Thr	Arg	Pro	Ser 300	Asn	Asn	Thr	Arg
Thr 305	Ser	Ile	Thr	Ile	Gly 310	Pro	Gly	Gln	Val	Phe 315	Tyr	Arg	Thr	Gly	Asp 320
Ile	Ile	Gly	Asp	Ile 325	Arg	Lys	Ala	Tyr	330	Glu	Ile	Asn	Gly	Thr 335	Lys
Trp	Asn	Glu	Val 340	Leu	Lys	Gln	Val	Thr 345	Glu	Lys	Leu	Lys	Glu 350	His	Phe
Asn	Asn	Ļуs 355	Thr	Ile	Ile	Phe	Gln 360	Pro	Pro	Ser	Gly	Gly 365	Asp	Leu	Glu
Ile	Thr 370	Met	His	His	Phe	Asn 375	Cys	Arg	Gly	Glu	Phe 380	Phe	Tyr	Cys	Asn
Thr 385	Thr	Lys	Leu	Phe	Asn 390	Asn	Thr	Cys	Ile	Gly 395	Asn	Glu	Thr	Met	Glu 400
Gly	Cys	Asn	Gly	Thr 405	Ile	Ile	Leu	Pro	Cys 410	Lys	Ile	Lys	Gln	Ile 415	Ile
Asn	Met	Trp	Gln 420	Gly	Ala	Gly	Gln	Ala 425	Met	Tyr	Ala	Pro	Pro 430	Ile	Ser

Gly	Arg	Ile 435	Asn	Cys	Val	Ser	Asn 440	Ile	Thr	Gly	Ile	Leu 445	Leu	Thr	Arg
Asp	Gly 450	Gly	Ala	Asn	Asn	Thr 455	Asn	Glu	Thr	Phe	Arg 460	Pro	Gly	Gly	Gly
Asn 465	Ile	Lys	Asp	Asn	Trp 470	Arg	Ser	Glu	Leu	Tyr 475	Lys	Tyr	Lys	Val	Val 480
Gln	Ile	Glu	Pro	Leu 485	Gly	Ile	Ala	Pro	Thr 490	Arg	Ala	Lys	Arg	Arg 495	Val
Val	Glu	Arg	Glu 500	Lys	Arg	Ala	Val	Gly 505	Ile	Gly	Ala	Met	Ile 510	Phe	Gly
Phe	Leu	Gly 515	Ala	Ala	Gly	Ser	Thr 520	Met	Gly	Ala	Ala	Ser 525	Ile	Thr	Leu
Thr	Val 530	Gln	Ala	Arg	Gln	Leu 535	Leu	Ser	Gly	Ile	Val 540	Gln	Gln	Gln	Ser
Asn 545	Leu	Leu	Arg	Ala	Ile 550	Glu	Ala	Gln	Gln	His 555	Leu	Leu	Gln	Leu	Thr 560
Val	Trp	Gly	Ile	Lys 565	Gln	Leu	Gln	Ala	Arg 570	Val	Leu	Ala	Val	Glu 575	Arg
Tyr	Leu	Lys	Asp 580	Gln	Lys	Phe	Leu	Gly 585	Leu	Trp	Gly	Cys	Ser 590	Gly	Lys
Ile	Ile	Cys 595	Thr	Thr	Ala	Val	Pro 600	Trp	Asn	Ser	Thr	Trp 605	Ser	Asn	Arg
Ser	Phe 610	Glu	Glu	Ile	Trp	Asn 615	Asn	Met	Thr	Trp	Ile 620	Glu	Trp	Glu	Arg
Glu 625	Ile	Ser	Asn	Tyr	Thr 630	Asn	Gln	Ile	Tyr	Glu 635	Ile	Leu	Thr	Glu	Ser 640
Gln	Asn	Gln	Gln	Asp 645	Arg	Asn	Glu	Lys	Asp 650	Leu	Leu	Glu	Leu	Asp 655	Lys
Trp	Ala	Ser	Leu 660	Trp	Asn	Trp	Phe	Asp 665	Ile	Thr	Asn	Trp	Leu 670	Trp	Tyr
Ile	Lys	Ile 675	Phe	Ile	Met	Ile	Val 680	Gly	Gly	Leu	Ile	Gly 685	Leu	Arg	Ile
Ile	Phe 690	Ala	Val	Leu	Ser	Ile 695	Val	Asn	Arg	Val	Arg 700	Gln	Gly	Tyr	Ser
Pro	Leu	Ser	Phe	Gln	Thr 710	Pro	Thr	His	His	Gln 715	Arg	Glu	Pro	Asp	Arg 720

Pro Glu Arg Ile Glu Glu Gly Gly Glu Gln Gly Arg Asp Arg Ser 725 730 735

- Val Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg
 740 745 750
- Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile 755 760 765
- Ala Ala Arg Thr Val Glu Leu Leu Gly His Ser Ser Leu Lys Gly Leu 770 780
- Arg Arg Gly Trp Glu Gly Leu Lys Tyr Leu Gly Asn Leu Leu Leu Tyr 785 790 795 800
- Trp Gly Gln Glu Leu Lys Ile Ser Ala Ile Ser Leu Leu Asp Ala Thr 805 810 815
- Ala Ile Ala Val Ala Gly Trp Thr Asp Arg Val Ile Glu Val Ala Gln 820 825 830
- Gly Ala Trp Arg Ala Ile Leu His Ile Pro Arg Arg Ile Arg Gln Gly 835 840 845

Leu Glu Arg Ala Leu Leu 850

<210> 48

<211> 638

<212> PRT

<213> Human immunodeficiency virus

<400> 48

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- Gly Thr Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Ser Asp Asn 20 25 30
- Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Asp 35 40 45
- Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala His Glu Thr Glu Val
 50 55 60
- His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80
- Gln Glu Ile His Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95
- Asn Asn Met Val Glu Gln Met Gln Glu Asp Val Ile Ser Leu Trp Asp 100 105 110
- Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125
- Asn Cys Thr Asn Ala Asn Leu Thr Asn Val Asn Asn Ile Thr Asn Val

Ser Asn Ile Ile Gly Asn Ile Thr Asn Glu Val Arg Asn Cys Ser Phe 150 155 145 Asn Met Thr Thr Glu Leu Arg Asp Lys Lys Gln Lys Val His Ala Leu 170 Phe Tyr Lys Leu Asp Ile Val Gln Ile Glu Asp Asn Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Val Ile Lys Gln Ala Cys Pro Lys Ile Ser Phe Asp Pro Ile Pro Ile His Tyr Cys Thr Pro Ala Gly Tyr Ala 215 Ile Leu Lys Cys Asn Asp Lys Asn Phe Asn Gly Thr Gly Pro Cys Lys 240 225 230 235 Asn Val Ser Ser Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Ile 265 Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile Ile Val His Leu 275 Asn Lys Ser Val Glu Ile Asn Cys Thr Arg Pro Ser Asn Asn Thr Arg Thr Ser Ile Thr Ile Gly Pro Gly Gln Val Phe Tyr Arg Thr Gly Asp 310 315 320 Ile Ile Gly Asp Ile Arg Lys Ala Tyr Cys Glu Ile Asn Gly Thr Lys 330 Trp Asn Glu Val Leu Lys Gln Val Thr Glu Lys Leu Lys Glu His Phe 345 Asn Asn Lys Thr Ile Ile Phe Gln Pro Pro Ser Gly Gly Asp Leu Glu 355 Ile Thr Met His His Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn 375 Thr Thr Lys Leu Phe Asn Asn Thr Cys Ile Gly Asn Glu Thr Met Glu 390 Gly Cys Asn Gly Thr Ile Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile Asn Met Trp Gln Gly Ala Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser 425

Gly Arg Ile Asn Cys Val Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg

435 440 445

Asp Gly Gly Ala Asn Asn Thr Asn Glu Thr Phe Arg Pro Gly Gly 450 460

Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 470 475 480

Gln Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Thr Leu Thr 485 490 495

Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn 500 505 510

Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val
515 520 525

Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr 530 535 540

Leu Lys Asp Gln Lys Phe Leu Gly Leu Trp Gly Cys Ser Gly Lys Ile 545 550 555 560

Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Thr Trp Ser Asn Arg Ser 565 570 575

Phe Glu Glu Ile Trp Asn Asn Met Thr Trp Ile Glu Trp Glu Arg Glu
580 585 590

Ile Ser Asn Tyr Thr Asn Gln Ile Tyr Glu Ile Leu Thr Glu Ser Gln
595 600 605

Asn Gln Gln Asp Arg Asn Glu Lys Asp Leu Leu Glu Leu Asp Lys Trp 610 620

Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp 625 630 635

<210> 49

<211> 1945

<212> DNA

<213> Human immunodeficiency virus

<400> 49

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agaacctcac caacaacgct aagactatca tcgtacatct caataaatca gtcgaaatta 900
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tttatagaac aggagatatc ataggagata tcagaaaggc atattgcgag ataaacggga 1020
caaaatggaa cgaagtactc aaacaagtca cagagaagct taaggaacat ttcaacaata 1080
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actgccgcgg cgaatttttt tattgcaata ccactaaact tttcaacaat acgtgcatcg 1200
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actatacgaa ccagatatac gaaatcctca ccgaaagcca aaatcagcag gatcgcaacg 1860
aaaaagacct cctcgagctt gataagtggg catccctttg gaactggttc gacatcacaa 1920
                                                                  1945
attggctctg gtaaagatct tacaa
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<210> 50
<211> 863
<212> PRT
<213> Human immunodeficiency virus
<400> 50
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Ser Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Glu
         35
Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala His Asp Lys Glu Val
                         55
                                              60
His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
                                          75
 65
                     70
Gln Glu Met Ile Leu Glu Asn Val Thr Glu Asp Phe Asn Met Trp Lys
Asn Ser Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp
                                 105
            100
Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
        115
                            120
Asn Cys Ser Asp Ser Asn Ile Thr Ser Asn Ser Thr Ser Asn Ser Thr
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135

Lys Asp Ser Ala Thr Leu Asp Met Lys Ser Glu Ile Gln Asn Cys Ser

Phe Asn Met Thr Thr Glu Leu Arg Asp Lys Lys Gln Lys Val Tyr Ser 165 170 175

Leu Phe Tyr Arg Leu Asp Val Val Gln Ile Asn Glu Asn Ser Ser Asp 180 185 190

Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala Cys Pro 195 200 205

Lys Val Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly 210 215 220

Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe Asn Gly Thr Gly Pro 225 230 235 240

Cys Thr Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val 245 250 255

Val Thr Thr Gln Leu Leu Asn Gly Ser Leu Ala Glu Glu Val 260 265 270

Met Ile Arg Ser Glu Asn Ile Thr Glu Asn Ala Lys Asn Ile Ile Val 275 280 285

Gln Phe Lys Glu Pro Val Gln Ile Ile Cys Ile Arg Pro Gly Asn Asn 290 295 300

Thr Arg Lys Ser Val His Ile Gly Pro Gly Gln Ala Phe Tyr Ala Thr 305 310 315 320

Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Val Ser Arg 325 330 335

Glu Leu Trp Asn Lys Thr Leu Gln Glu Val Ala Thr Gln Leu Arg Lys 340 345 350

His Phe Arg Asn Asn Thr Lys Ile Ile Phe Thr Asn Ser Ser Gly Gly 355 360 365

Asp Val Glu Ile Thr Thr His Ser Phe Asn Cys Gly Glu Phe Phe 370 380

Tyr Cys Asp Thr Ser Gly Leu Phe Asn Ser Ser Trp Thr Ala Ser Asn 385 390 395 400

Asp Ser Met Gln Glu Ala His Ser Thr Glu Ser Asn Ile Thr Leu Gln 405 410 415

Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Arg Ala Gly Gln Ala 420 425 430

Met Tyr Ala Pro Pro Ile Pro Gly Ile Ile Arg Cys Glu Ser Asn Ile 435 440 445

Thr Gly Leu Ile Leu Thr Arg Asp Gly Gly Glu Gly Asn Asn Ser Thr

Asn Glu Thr Phe Arg Pro Val Gly Gly Asn Met Arg Asp Asn Trp Arg 470 465 Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Val Glu Pro Leu Gly Val Ala Pro Thr Lys Ser Arg Arg Arg Val Val Glu Arg Glu Lys Arg Ala 505 Val Gly Leu Gly Ala Val Phe Ile Gly Phe Leu Gly Ala Ala Gly Ser 520 Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu 535 Leu Ser Gly Ile Val Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu 545 550 555 560 Ala Gln Gln His Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu 570 565 Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Arg Asp Gln Gln Leu 585 580 Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val 595 Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Leu Asp Glu Ile Trp Glu Asn Met Thr Trp Met Gln Trp Asp Lys Glu Val Ser Asn Tyr Thr Gln 635 640 Met Ile Tyr Asn Leu Leu Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn 650 Glu Glu Leu Leu Ala Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp 665 Phe Asn Ile Ser Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile 675 Val Gly Gly Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Ser Val 695 Ile Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr His 710 715 Thr Pro Asn Pro Arg Gly Leu Asp Arg Pro Gly Arg Ile Glu Glu 725 Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe 745

Leu Ala Leu Ala Trp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr

His Arg Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg Thr Leu Glu Leu 770 780

Leu Gly His Asn Ser Leu Lys Gly Leu Arg Leu Gly Trp Glu Gly Leu 785 790 795 800

Lys Tyr Leu Trp Asn Leu Leu Ala Tyr Trp Gly Arg Glu Leu Lys Ile 805 810 815

Ser Ala Ile Ser Leu Val Asp Ser Ile Ala Ile Ala Val Ala Gly Trp 820 825 830

Thr Asp Arg Ile Ile Glu Ile Val Gln Ala Ile Gly Arg Ala Ile Leu 835 840 845

His Ile Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Ile 850 855 860

<210> 51

<211> 647

<212> PRT

<213> Human immunodeficiency virus

<400> 51

Met Gly Ala Met Gly Ile Gln Met Asn Trp Gln Asn Leu Trp Arg Trp

1 5 10 15

Gly Thr Met Ile Leu Gly Met Leu Ile Ile Cys Ser Val Ala Glu Lys 20 25 30

Ser Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Glu 35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala His Asp Lys Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Met Ile Leu Glu Asn Val Thr Glu Asp Phe Asn Met Trp Lys 85 90 95

Asn Ser Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Ser Asp Ser Asn Ile Thr Ser Asn Ser Thr Ser Asn Ser Thr 130 135 140

Lys Asp Ser Ala Thr Leu Asp Met Lys Ser Glu Ile Gln Asn Cys Ser 145 150 155 160

Phe	Asn	Met	Thr	Thr 165	Glu	Leu	Arg	Asp	Lys 170	Lys	Gln	Lys	Val	Tyr 175	Ser
Leu	Phe	Tyr	Arg 180	Leu	Asp	Val	Val	Gln 185	Ile	Asn	Glu	Asn	Ser 190	Ser	Asp
Tyr	Arg	Leu 195	Ile	Asn	Cys	Asn	Thr 200	Ser	Ala	Ile	Thr	Gln 205	Ala	Cys	Pro
Lys	Val 210	Thr	Phe	Glu	Pro	Ile 215	Pro	Ile	His	Tyr	Cys 220	Ala	Pro	Ala	Gly
Phe 225	Ala	Ile	Leu	Lys	Cys 230	Asn	Asp	Lys	Lys	Phe 235	Asn	Gly	Thr	Gly	Pro 240
Cys	Thr	Asn	Val	Ser 245	Thr	Val	Gln	Cys	Thr 250	His	Gly	Ile	Lys	Pro 255	Val
Val	Thr	Thr	Gln 260	Leu	Leu	Leu	Asn	Gly 265	Ser	Leu	Ala	Glu	Glu 270	Glu	Val
Met	Ile	Arg 275	Ser	Glu	Asn	Ile	Thr 280	Glu	Asn	Ala	Lys	Asn 285	Ile	Ile	Val
Gln	Phe 290	Lys	Glu	Pro	Val	Gln 295	Ile	Ile	Cys	Ile	Arg 300	Pro	Gly	Asn	Asn
Thr 305	Arg	Lys	Ser	Val	His 310	Ile	Gly	Pro	Gly	Gln 315	Ala	Phe	Tyr	Ala	Thr 320
Gly	Asp	Ile	Ile	Gly 325	Asp	Ile	Arg	Gln	Ala 330	His	Суз	Asn	Val	Ser 335	Arg
Glu	Leu	Trp	Asn 340	Lys	Thr	Leu	Gln	Glu 345	Val	Ala	Thr	Gln	Leu 350	Arg	Lys
His	Phe	Arg 355	Asn	Asn	Thr	Lys	Ile 360	Ile	Phe	Thr	Asn	Ser 365	Ser	Gly	Gly
Asp	Val 370	Glu	Ile	Thr	Thr	His 375	Ser	Phe	Asn	Cys	Gly 380	Gly	Glu	Phe	Phe.
Tyr 385	Cys	Asp	Thr	Ser	Gly 390	Leu	Phe	Asn	Ser	Ser 395	Trp	Thr	Ala	Ser	Asn 400
Asp	Ser	Met	Gln	Glu 405	Ala	His	Ser	Thr	Glu 410	Ser	Asn	Ile	Thr	Leu 415	Gln
Cys	Arg	Ile	Lys 420	Gln	Ile	Ile	Asn	Met 425	Trp	Gln	Arg	Ala	Gly 430	Gln	Ala
Met	Tyr	Ala 435	Pro	Pro	Ile	Pro	Gly 440	Ile	Ile	Arg	Cys	Glu 445	Ser	Asn	Ile
Thr	Gly 450	Leu	Ile	Leu	Thr	Arg 455	Asp	Gly	Gly	Glu	Gly 460	Asn	Asn	Ser	Thr

Asn Glu Thr Phe Arg Pro Val Gly Gly Asn Met Arg Asp Asn Trp Arg 465 470 475 Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Val Glu Pro Leu Gly Val 490 485 Ala Pro Thr Lys Ser Arg Thr Leu Thr Val Gln Ala Arg Gln Leu Leu 510 505 500 Ser Gly Ile Val Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala 525 520 515 Gln Gln His Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln 535 Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Arg Asp Gln Gln Leu Leu 545 550 555 Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro 570 Trp Asn Ser Ser Trp Ser Asn Lys Ser Leu Asp Glu Ile Trp Glu Asn 585 590 Met Thr Trp Met Gln Trp Asp Lys Glu Val Ser Asn Tyr Thr Gln Met 605 595 600 Ile Tyr Asn Leu Leu Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu 615 Gln Glu Leu Leu Ala Leu Asp Lys Trp Ala Asn Leu Trp Asn Trp Phe 640 625 630 635 Asn Ile Ser Asn Trp Leu Trp 645 <210> 52 <211> 1972

<212> DNA <213> Human immunodeficiency virus

<400> 52

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aggettteta tgeaacegga gatattatag gegacateag acaggeacat tgeaacgtea 1020
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gagaccaaca actcctggga atctggggat gttccggtaa gttgatttgc acgacaaacg 1740
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qqatqcaqtq qqacaaqqaa qttaqcaact atacacagat gatctacaac ctcctcgaag 1860
aatctcagaa tcaacaggaa aaaaacgaac aagaactgct cgccctcgat aagtgggcta 1920
acctctggaa ctggtttaat atttcaaact ggttgtggta aagatcttac aa
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<210> 53 <211> 861

<212> PRT

<213> Human immunodeficiency virus

<400> 53

Met Arg Val Lys Glu Ile Arg Arg Asn Cys Gln Arg Leu Arg Arg Trp
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Gly Thr Met Leu Leu Gly Met Leu Met Ile Cys Ser Ala Thr Glu Gln
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Val Thr Glu Lys 50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Val Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Glu
100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Lys Leu Arg Asn Asp Thr Ser Gly Thr Asn Ser Ser 130 135 140

Ser Trp Glu Lys Val Gln Lys Gly Glu Ile Lys Asn Cys Ser Phe Asn 145 150 155 160

Ile	Thr	Thr	Gly	Ile 165	Arg	Gly	Arg	Val	Gln 170	Glu	Tyr	Ser	Leu	Phe 175	Tyr
Lys	Leu	Asp	Val 180	Ile	Pro	Ile	Asp	Ser 185	Arg	Asn	Asn	Ser	Asn 190	Asn	Ser
Thr	Glu	Phe 195	Ser	Ser	Tyr	Arg	Leu 200	Ile	Ser	Cys	Asn	Thr 205	Ser	Val	Ile
Thr	Gln 210	Ala	Cys	Pro	Lys	Ile 215	Ser	Phe	Glu	Pro	Ile 220	Pro	Ile	His	Tyr
Cys 225	Ala	Pro	Ala	Gly	Phe 230	Ala	Ile	Leu	Lys	Cys 235	Asn	Asp	Lys	Lys	Phe 240
Asn	Gly	Thr	Gly	Pro 245	Cys	Lys	Asn	Val	Ser 250	Thr	Val	Gln	Cys	Thr 255	His
Gly	Ile	Lys	Pro 260	Val	Val	Ser	Thr	Gln 265	Leu	Leu	Leu	Asn	Gly 270	Ser	Leu
Ala	Glu	Glu 275	Glu	Val	Val	Ile	Arg 280	Ser	Glu	Asn	Phe	Thr 285	Asn	Asn	Val
Lys	Ser 290	Ile	Ile	Val	Gln	Leu 295	Asn	Lys	Ser	Val	Val 300	Ile	Asn	Cys	Thr
Arg 305	Pro	Asn	Asn	Asn	Thr 310	Arg	Lys	Ser	Ile	His 315	Ile	Gly	Ala	Gly	Lys 320
Ala	Leu	Tyr	Thr	Gly 325	Glu	Ile	Ile	Gly	Asp 330	Ile	Arg	Gln	Ala	His 335	Cys
Asn	Leu	Ser	Arg 340	Ala	Gln	Trp	Asn	Asn 345	Thr	Leu	Lys	Gln	Ile 350	Val	Ile
Lys	Leu	Arg 355	Glu	Gln	Phe	Gly	Asn 360	Lys	Thr	Ile	Val	Phe 365	Asn	Gln	Ser
Ser	Gly 370	Gly	Asp	Val	Glu	Ile 375	Val	Met	His	Ser	Phe 380	Asn	Cys	Gly	Gly
Glu 385	Phe	Phe	Tyr	Cys	Asn 390	Ser	Thr	Gln	Leu	Phe 395	Asn	Ser	Thr	Trp	Asn 400
Gly	Asn	Asp	Thr	Trp 405	Asn	Asp	Thr	Trp	Lys 410	Asp	Thr	Thr	Asn	Asp 415	Asn
Ile	Thr	Leu	Pro 420	Cys	Arg	Ile	Lys	Gln 425	Ile	Val	Asn	Met	Trp 430	Gln	Lys
Val	Gly	Lys 435	Ala	Met	Tyr	Ala	Pro 440	Pro	Ile	Arg	Gly	Gln 445	Ile	Arg	Cys
Ser	Ser 450	Lys	Ile	Thr	Gly	Leu 455	Ile	Leu	Thr	Arg	Asp 460	Gly	Gly	Thr	Asn

Gly 465	Thr	Asn	Glu	Thr	Glu 470	Thr	Phe	Arg	Pro	Gly 475	Gly	Gly	Asn	Met	Lys 480
Asp	Asn	Trp	Arg	Ser 485	Glu	Leu	Tyr	Lys	Tyr 490	Lys	Val	Val	Lys	Ile 495	Glu
Pro	Leu	Gly	Ile 500	Ala	Pro	Thr	Lys	Ala 505	Lys	Arg	Arg	Val	Val 510	Gln	Arg
Glu	Lys	Arg 515	Ala	Val	Gly	Thr	Ile 520	Gly	Ala	Met	Phe	Leu 525	Gly	Phe	Leu
Gly	Ala 530	Ala	Gly	Ser	Thr	Met 535	Gly	Ala	Ala	Ser	Leu 540	Thr	Leu	Thr	Val
Gln 545	Ala	Arg	Leu	Leu	Leu 550	Ser	Gly	Ile	Val	Gln 555	Gln	Gln	Asn	Asn	Leu 560
Leu	Arg	Ala	Ile	Glu 565	Ala	Gln	Gln	His	Leu 570	Leu	Gln	Leu	Thr	Val 575	Trp
Gly	Ile	Lys	Gln 580	Leu	Gln	Ala	Arg	Val 585	Leu	Ala	Val	Glu	Arg 590	Tyr	Leu
Arg	Asp	Gln 595	Gln	Leu	Leu	Gly	Ile 600	Trp	Gly	Cys	Ser	Gly 605	Arg	Leu	Ile
-	Thr 610					615				_	620				
625	Tyr		_		630					635					640
	Asn			645					650					655	
	Gln		660					665					670		
	Leu	675					680					685			
	Phe 690					695					700				
705	Val				710					715					720
	Leu			725					730					735	
-	Ile	_	740		-	_		745					750		
Leu	Val	His 755	Gly	Phe	Leu	Ala	Leu 760	Val	Trp	Glu	Asp	Leu 765	Arg	Ser	Leu

Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Leu Leu Leu Ile Val Ala 770 775 780

Arg Thr Val Glu Ile Leu Gly Gln Arg Gly Trp Glu Ala Leu Lys Tyr 785 790 795 800

Trp Trp Asn Leu Leu Tyr Trp Ser Leu Glu Leu Lys Asn Ser Ala 805 810 815

Val Ser Leu Val Asp Thr Ile Ala Ile Ala Val Ala Glu Gly Thr Asp 820 825 830

Arg Ile Ile Glu Ile Ala Arg Arg Ile Phe Arg Ala Phe Leu His Ile 835 840 845

Pro Thr Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu 850 855 860

<210> 54

<211> 651

<212> PRT

<213> Human immunodeficiency virus

<400> 54

Met Arg Val Lys Glu Ile Arg Arg Asn Cys Gln Arg Leu Arg Arg Trp

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Gly Thr Met Leu Gly Met Leu Met Ile Cys Ser Ala Thr Glu Gln
20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr 35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Val Thr Glu Lys 50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Val Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Glu 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Lys Leu Arg Asn Asp Thr Ser Gly Thr Asn Ser Ser 130 135 140

Ser Trp Glu Lys Val Gln Lys Gly Glu Ile Lys Asn Cys Ser Phe Asn 145 150 155 160

Ile Thr Thr Gly Ile Arg Gly Arg Val Gln Glu Tyr Ser Leu Phe Tyr 165 170 175

- Lys Leu Asp Val Ile Pro Ile Asp Ser Arg Asn Asn Ser Asn Asn Ser 190

 Thr Glu Phe Ser Ser Tyr Arg Leu Ile Ser Cys Asn Thr Ser Val Ile 195
- Thr Gln Ala Cys Pro Lys Ile Ser Phe Glu Pro Ile Pro Ile His Tyr 210 215 220
- Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe 225 230 235 235
- Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys Thr His 245 250 255
- Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu 260 265 270
- Ala Glu Glu Val Val Ile Arg Ser Glu Asn Phe Thr Asn Asn Val 275 280 285
- Lys Ser Ile Ile Val Gln Leu Asn Lys Ser Val Val Ile Asn Cys Thr 290 295 300
- Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile His Ile Gly Ala Gly Lys 305 310 315 320
- Ala Leu Tyr Thr Gly Glu Ile Ile Gly Asp Ile Arg Gln Ala His Cys 325 330 335
- Asn Leu Ser Arg Ala Gln Trp Asn Asn Thr Leu Lys Gln Ile Val Ile 340 345 350
- Lys Leu Arg Glu Gln Phe Gly Asn Lys Thr Ile Val Phe Asn Gln Ser 355 360 365
- Ser Gly Gly Asp Val Glu Ile Val Met His Ser Phe Asn Cys Gly Gly 370 375 380
- Glu Phe Phe Tyr Cys Asn Ser Thr Gln Leu Phe Asn Ser Thr Trp Asn 385 390 395 400
- Gly Asn Asp Thr Trp Asn Asp Thr Trp Lys Asp Thr Thr Asn Asp Asn 405 410 415
- Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Val Asn Met Trp Gln Lys
 420 425 430
- Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Arg Gly Gln Ile Arg Cys 435 440 445
- Ser Ser Lys Ile Thr Gly Leu Ile Leu Thr Arg Asp Gly Gly Thr Asn 450 455 460
- Gly Thr Asn Glu Thr Glu Thr Phe Arg Pro Gly Gly Gly Asn Met Lys 465 470 475 480

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Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu
                485
                                    490
Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys Thr Leu Thr Val Gln Ala
                                505
                                                    510
            500
Arg Leu Leu Ser Gly Ile Val Gln Gln Asn Asn Leu Leu Arg
                            520
Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile
                        535
Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Arg Asp
                    550
545
Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Arg Leu Ile Cys Thr
                                    570
                565
Thr Asn Val Pro Trp Asn Thr Ser Trp Ser Asn Arg Ser Leu Asn Tyr
                                585
Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu Ile Asn Asn
        595
Tyr Thr Asp Tyr Ile Tyr Thr Leu Leu Glu Asp Ala Gln Asn Gln Gln
                        615
Glu Lys Asn Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu
                                                             640
625
                    630
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Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp
645 650

<210> 55 <211> 1984 <212> DNA <213> Human immunodeficiency virus

<400> 55

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acaatatgac atggatgcaa tgggatagag aaattaataa ctacaccgac tacatctaca 1860
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acaa
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<210> 56

<211> 854

<212> PRT

<213> Human immunodeficiency virus

<400> 56

Met Arg Val Lys Gly Ile Gln Arg Asn Trp Pro Gln Trp Trp Ile Trp

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Gly Ile Leu Gly Phe Trp Met Ile Ile Cys Arg Val Val Gly Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Thr Glu Ala Lys
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Arg Glu Val 50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Val Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Ile Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Val Lys Val Asn Ala Thr Ser Asn Gly Thr Thr Thr 130 135 140

Tyr Asn Asn Ser Ile Asp Ser Met Asn Gly Glu Ile Lys Asn Cys Ser 145 150 155 160

Phe Asn Ile Thr Thr Glu Ile Arg Asp Lys Lys Gln Lys Val Tyr Ala

Leu Phe Tyr Arg Pro Asp Val Val Pro Leu Asn Glu Asn Ser Ser Ser 185 180 Tyr Ile Leu Ile Asn Cys Asn Thr Ser Thr Thr Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr Gly Pro 235 225 Cys His Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val 250 Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile 265 260 Ile Ile Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile Ile Val His Leu Asn Glu Ser Ile Glu Ile Val Cys Thr Arg Pro Asn Asn Asn 295 Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Thr Val Tyr Ala Thr 305 Asn Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser Lys Thr Lys Trp Asn Thr Thr Leu Glu Lys Val Lys Glu Lys Leu Lys Glu His Phe Pro Ser Lys Ala Ile Thr Phe Gln Pro His Ser Gly Gly Asp Leu Glu Val Thr His Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr 375 Cys Asp Thr Thr Lys Leu Phe Asn Glu Ser Asn Leu Asn Thr Thr Asn 395 400 Thr Thr Thr Leu Thr Leu Pro Cys Arg Ile Lys Gln Ile Val Asn Met Trp Gln Gly Val Gly Arg Ala Met Tyr Ala Pro Pro Val Glu Gly Asn 425 Ile Thr Cys Asn Ser Ser Ile Thr Gly Leu Leu Leu Val Arg Asp Gly 435 440 Gly Asn Thr Ser Asn Ser Thr Pro Glu Ile Phe Arg Pro Gly Gly 455

Asn Met Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val

Glu Ile Lys Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val 485 490 495

Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Leu Phe Gly 500 505 510

Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu 515 520 525

Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser 530 540

Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr 545 550 555 560

Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Ile Glu Arg
565 570 575

Tyr Leu Lys Asp Gln Gln Leu Leu Gly Leu Trp Gly Cys Ser Gly Lys
580 585 590

Leu Ile Cys Pro Thr Thr Val Pro Trp Asn Ser Ser Trp Ser Asn Lys 595 600 605

Ser Gln Thr Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg 610 620

Glu Ile Ser Asn Tyr Thr Gly Thr Ile Tyr Lys Leu Leu Glu Glu Ser 625 630 635 640

Gln Asn Gln Gln Glu Lys Asn Glu Lys Asp Leu Leu Ala Leu Asp Ser 645 650 655

Trp Lys Asn Leu Trp Ser Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr 660 665 670

Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile 675 680 685

Ile Phe Gly Val Leu Ser Ile Val Lys Arg Val Arg Gln Gly Tyr Ser 690 695 700

Pro Leu Ser Phe Gln Thr Leu Thr Pro Asn Pro Arg Gly Leu Asp Arg 705 710 715 720

Leu Gly Arg Ile Glu Glu Glu Gly Gly Glu Gln Asp Lys Asp Arg Ser
725 730 735

Ile Arg Leu Val Asn Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg
740 745 750

Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Val 755 760 765

Ala Ala Arg Ala Val Glu Leu Leu Gly Arg Ser Leu Arg Gly Leu

770	775	780

Gln Arg Gly Trp Glu Ala Leu Lys Tyr Leu Gly Asn Leu Val Gln Tyr
785 790 795 800

Gly Gly Leu Glu Leu Lys Arg Arg Ala Ile Ser Leu Phe Asp Thr Ile 805 810 815

Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Leu Glu Val Ile Leu 820 825 830

Arg Ile Ile Arg Ala Ile Arg Asn Ile Pro Thr Arg Ile Arg Gln Gly 835 840 845

Phe Glu Ala Ala Leu Leu 850

<210> 57

<211> 638

<212> PRT

<213> Human immunodeficiency virus

<400> 57

Met Arg Val Lys Gly Ile Gln Arg Asn Trp Pro Gln Trp Trp Ile Trp 1 5 10 15

Gly Ile Leu Gly Phe Trp Met Ile Ile Cys Arg Val Val Gly Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Thr Glu Ala Lys
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Arg Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Val Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Ile Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Val Lys Val Asn Ala Thr Ser Asn Gly Thr Thr Thr 130 135 140

Tyr Asn Asn Ser Ile Asp Ser Met Asn Gly Glu Ile Lys Asn Cys Ser 145 150 155 160

Phe Asn Ile Thr Thr Glu Ile Arg Asp Lys Lys Gln Lys Val Tyr Ala 165 170 175 Leu Phe Tyr Arg Pro Asp Val Val Pro Leu Asn Glu Asn Ser Ser Ser 180 185 Tyr Ile Leu Ile Asn Cys Asn Thr Ser Thr Thr Gln Ala Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr Gly Pro 235 Cys His Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val 250 Val Ser Thr Gln Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile 265 260 Ile Ile Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile Ile Val His Leu Asn Glu Ser Ile Glu Ile Val Cys Thr Arg Pro Asn Asn Asn 295 Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Thr Val Tyr Ala Thr 305 Asn Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser Lys Thr Lys Trp Asn Thr Thr Leu Glu Lys Val Lys Glu Lys Leu Lys Glu 340 His Phe Pro Ser Lys Ala Ile Thr Phe Gln Pro His Ser Gly Gly Asp 360 Leu Glu Val Thr Thr His Ser Phe Asn Cys Arg Gly Glu Phe Phe Tyr 380 375 Cys Asp Thr Thr Lys Leu Phe Asn Glu Ser Asn Leu Asn Thr Thr Asn 400 385 Thr Thr Leu Thr Leu Pro Cys Arg Ile Lys Gln Ile Val Asn Met Trp Gln Gly Val Gly Arg Ala Met Tyr Ala Pro Pro Val Glu Gly Asn 425 Ile Thr Cys Asn Ser Ser Ile Thr Gly Leu Leu Val Arg Asp Gly Gly Asn Thr Ser Asn Ser Thr Pro Glu Ile Phe Arg Pro Gly Gly Gly 455 460 Asn Met Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 480 470 475 465

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Glu Ile Lys Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Thr Leu Thr
                                    490
                485
Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn
            500
                                505
Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr Val
                            520
Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Ile Glu Arg Tyr
                        535
Leu Lys Asp Gln Gln Leu Leu Gly Leu Trp Gly Cys Ser Gly Lys Leu
                                        555
                    550
Ile Cys Pro Thr Thr Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser
                565
Gln Thr Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu
                                585
Ile Ser Asn Tyr Thr Gly Thr Ile Tyr Lys Leu Leu Glu Glu Ser Gln
                            600
                                                 605
Asn Gln Gln Glu Lys Asn Glu Lys Asp Leu Leu Ala Leu Asp Ser Trp
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Lys Asn Leu Trp Ser Trp Phe Asp Ile Thr Asn Trp Leu Trp
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<210> 58 <211> 1945 <212> DNA

<213> Human immunodeficiency virus

<400> 58

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<210> 59
<211> 854
<212> PRT
<213> Human immunodeficiency virus
<400> 59
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Gly Thr Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Ser Asp Asn
             20
                                  25
Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Asp
Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala His Glu Thr Glu Val
     50
                         55
His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
65
                     70
Gln Glu Ile His Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Arg
                                      90
Asn Asn Met Val Glu Gln Met Gln Glu Asp Val Ile Ser Leu Trp Asp
            100
Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu
Asn Cys Thr Asn Ala Asn Trp Thr Asn Ser Asn Asn Thr Thr Asn Gly
                        135
Pro Asn Lys Ile Gly Asn Ile Thr Asp Glu Val Lys Asn Cys Thr Phe
145
                    150
                                         155
Asn Met Thr Thr Glu Leu Lys Asp Lys Lys Gln Lys Val His Ala Leu
                165
                                     170
Phe Tyr Lys Leu Asp Ile Val Gln Ile Asn Ser Ser Glu Tyr Arg Leu
                                                     190
            180
                                 185
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Val Ser Val Gln Cys Thr His Gly Ile Lys Pro Val Ser Thr 255 Gln Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Ile Ile Ile Ile Arg 270 Ser Glu Asn Asn Glu Glu Glu Asn Asn Asn Asn Asn Asn Asn Asn Asn Thr Arg Pro Ser Asn Asn Asn Thr Arg Pro Ser Asn Asn Asn Thr Arg Thr Arg Thr Arg Thr Asn Asn Thr Arg Thr Arg Thr Arg Thr Arg Thr Arg Thr Arg Arg Thr Arg Arg Arg Arg Arg Arg Arg Arg Arg																
210	Ile	Asn	-	Asn	Thr	Ser	Val		Lys	Gln	Ala	Cys		Lys	Ile	Ser
225 230 235 240 Val Ser Ser Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr 255 255 Thr 255 Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Ile Arg 260 Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile Ile Val His Leu Asn 275 Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile Ile Val His Leu Asn 275 Ser Val Glu Ile Asn Cys Thr Arg Pro Ser Asn Asn Thr Arg Thr 300 Ser Ile Thr Met Gly Pro Gly Gln Val Phe Tyr Arg Thr Gly Asp Ile 315 310 Ser Ile Gly Asp Ile Arg Lys Ala Tyr Cys Glu Ile Asn Gly Ile Lys Trp 335 Asn Glu Val Leu Val Gln Val Thr Gly Lys Leu Lys Glu His Phe Asn 340 Lys Thr Ile Ile Phe Gln Pro Pro Ser Gly Gly Asp Leu Glu Ile Ile 355 Thr His His Phe Ser Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Thr 370 Lys Leu Phe Asn Asn Thr Cys Ile Gly Asn Thr Ser Met Glu Gly Cys 395 Asn Asn Thr Ile Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile Asn Met 405 Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser Gly Arg 420 Ile Asn Cys Val Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly 440 Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	Phe	_	Pro	Ile	Pro	Ile		Tyr	Cys	Thr	Pro		Gly	Tyr	Ala	Ile
245		Lys	Cys	Asn	Asp	-	Asn	Phe	Asn	Gly		Gly	Pro	Cys	Lys	Asn 240
Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile Ile Val His Leu Asn 280 Lys Ser Val Glu Ile Asn Cys Thr Arg Pro Ser Asn Asn Thr Arg Thr 290 Ser Ile Thr Met Gly Pro Gly Gln Val Phe Tyr Arg Thr Gly Asp Ile 320 Ile Gly Asp Ile Arg Lys Ala Tyr Cys Glu Ile Asn Gly Ile Lys Trp 335 Asn Glu Val Leu Val Gln Val Thr Gly Lys Leu Lys Glu His Phe Asn 350 Lys Thr Ile Ile Phe Gln Pro Pro Ser Gly Gly Asp Leu Glu Ile Ile 355 Thr His His Phe Ser Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Thr 370 Lys Leu Phe Asn Asn Thr Cys Ile Gly Asn Thr Ser Met Glu Gly Cys 390 Asn Asn Thr Ile Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile Asn Met 415 Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser Gly Asp 435 Gly Ala Asp Asn Asn Thr Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly Gly Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Val Val 465 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	Val	Ser	Ser	Val		Cys	Thr	His	Gly		Lys	Pro	Val	Val		Thr
275 Lys Ser Val Glu Ile Asn Cys Thr Arg Pro Ser Asn Asn Thr Arg Thr 290 Ser Ile Thr Met Gly Pro 310 Ser Ile Thr Met Gly Pro 310 Ile Gly Asp Ile Arg Lys Ala Tyr Cys Glu Ile Asn Gly Ile Lys Trp 325 Asn Glu Val Leu Val Gln Val Thr Gly Lys Leu Lys Glu His Phe Asn 355 Asn Glu Val Ile Phe Gln Pro Pro Ser Gly Gly Asp Leu Glu Ile Ile 355 Thr His His Phe Ser Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Thr 370 Lys Leu Phe Asn Asn Thr Cys Ile Gly Asn Thr Ser Met Glu Gly Cys 395 Asn Asn Thr Ile Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile Asn Met 415 Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser Gly Arg 425 Gly Ala Asp Asn Asn Thr Thr Asn Glu Ile Leu Lys Tyr Lys Val Val 465 Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	Gln	Leu	Leu		Asn	Gly	Ser	Leu		Glu	Glu	Glu	Ile		Ile	Arg
290 Ser Ile Thr Met Gly Pro Gly Gln Val Phe Tyr Arg Thr Gly Asp Ile 320 Ile Gly Asp Ile Arg Lys Ala Tyr Cys Glu Ile Asn Gly Ile Lys Trp 335 Asn Glu Val Leu Val Gln Val Thr Gly Lys Leu Lys Glu His Phe Asn 345 Lys Thr Ile Ile Phe Gln Pro Pro Ser Gly Gly Asp Leu Glu Ile Ile 365 Thr His His Phe Ser Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Thr 370 Lys Leu Phe Asn Asn Thr Cys Ile Gly Asn Thr Ser Met Glu Gly Cys 395 Asn Asn Thr Ile Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile Asn Met 415 Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser Gly Arg 425 Gly Ala Asp Asn Asn Thr Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly Asn Ile Lys Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	Ser	Glu		Leu	Thr	Asn	Asn		Lys	Thr	Ile	Ile		His	Leu	Asn
310 315 320 Ile Gly Asp Ile Arg Lys Ala Tyr Cys Glu Ile Asn Gly Ile Lys Trp 325 Asn Glu Val Leu Val Gln Val Thr Gly Lys Leu Lys Glu His Phe Asn 340 Lys Thr Ile Ile Phe Gln Pro Pro Ser Gly Gly Asp Leu Glu Ile Ile 355 Thr His His Phe Ser Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Thr 370 Lys Leu Phe Asn Asn Thr Cys Ile Gly Asn Thr Ser Met Glu Gly Cys 395 Asn Asn Thr Ile Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile Asn Met 405 Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser Gly Arg 425 Gly Ala Asp Asn Asn Thr Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly Asn Ile Lys Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	Lys		Val	Glu	Ile	Asn	_	Thr	Arg	Pro	Ser		Asn	Thr	Arg	Thr
Asn Glu Val Leu Val Gln Val Thr Gly Lys Leu Lys Glu His Phe Asn 350 Lys Thr Ile Ile Phe Gln Pro Pro Ser Gly Gly Asp Leu Glu Ile Ile 355 Thr His His Phe Ser Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Thr 370 Lys Leu Phe Asn Asn Thr Cys Ile Gly Asn Thr Ser Met Glu Gly Cys 385 Asn Asn Thr Ile Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile Asn Met 405 Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser Gly Arg 425 Ile Asn Cys Val Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly 440 Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val		Ile	Thr	Met	Gly		Gly	Gln	Val	Phe	_	Arg	Thr	Gly	Asp	Ile 320
Lys Thr Ile Ile Phe Gln Pro Pro Ser Gly Gly Asp Leu Glu Ile Ile 355	Ile	Gly	Asp	Ile	_	Lys	Ala	Tyr	Cys		Ile	Asn	Gly	Ile		Trp
355 Thr His His Phe Ser Cys Arg Gly Glu Phe Phe Tyr Cys Asn Thr Thr 370 Lys Leu Phe Asn Asn Thr Cys Ile Gly Asn Thr Ser Met Glu Gly Cys 395 Asn Asn Thr Ile Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile Asn Met 415 Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser Gly Arg 420 Ile Asn Cys Val Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly 435 Gly Ala Asp Asn Asn Thr Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly 450 Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	Asn	Glu	Val		Val	Gln	Val	Thr		Lys	Leu	Lys	Glu		Phe	Asn
Lys Leu Phe Asn Asn Thr Cys Ile Gly Asn Thr Ser Met Glu Gly Cys 385 Leu Phe Asn Thr Cys Ile Gly Asn Thr Ser Met Glu Gln Ile Ile Asn Met Asn Asn Thr Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile Asn Met Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Asn Met Trp Gln Gly Val Ser Asn Ile Thr Ala Pro Pro Ile Ser Gly Asn Asn Asp Asn Gly Ile Thr Pro Pro Ile Asp Asp Asn Thr Thr Asn Glu Thr Pro Arg Pro Ile Arg Pro I	Lys	Thr		Ile	Phe	Gln	Pro		Ser	Gly	Gly	Asp		Glu	Ile	Ile
Asn Asn Thr Ile Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile Asn Met 415 Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser Gly Arg 420 Ile Asn Cys Val Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly 435 Gly Ala Asp Asn Asn Thr Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly 450 Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	Thr		His	Phe	Ser	Cys		Gly	Glu	Phe	Phe		Cys	Asn	Thr	Thr
Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser Gly Arg 430 Ile Asn Cys Val Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly 435 Gly Ala Asp Asn Asn Thr Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly 450 Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	_	Leu	Phe	Asn	Asn		Cys	Ile	Gly	Asn		Ser	Met	Glu	Gly	Cys 400
Ile Asn Cys Val Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg Asp Gly 435 Gly Ala Asp Asn Asn Thr Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly 450 Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	Asn	Asn	Thr	Ile		Leu	Pro	Cys	Lys		Lys	Gln	Ile	Ile		Met
435 Gly Ala Asp Asn Asn Thr Thr Asn Glu Thr Phe Arg Pro Gly Gly 450 Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	Trp	Gln	Gly		Gly	Gln	Ala	Met	-	Ala	Pro	Pro	Ile		Gly	Arg
450 455 460 Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 470 475 480 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	Ile	Asn	-	Val	Ser	Asn	Ile		Gly	Ile	Leu	Leu		Arg	Asp	Gly
465 470 475 480 Glu Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val	Gly		Asp	Asn	Asn	Thr		Asn	Glu	Thr	Phe		Pro	Gly	Gly	Gly
		Ile	Lys	Asp	Asn	_	Arg	Ser	Glu	Leu	_	Lys	Tyr	Lys	Val	Val 480
	Glu	Ile	Glu	Pro		Gly	Ile	Ala	Pro		Arg	Ala	Lys	Arg		Val

Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Met Ile Phe Gly 505 Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu 520 Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser 535 Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg 570 Tyr Leu Lys Asp Gln Lys Phe Leu Gly Leu Trp Gly Cys Ser Gly Lys 585 Ile Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys 600 Ser Phe Glu Glu Ile Trp Asp Asn Met Thr Trp Ile Glu Trp Glu Arg 615 Glu Ile Ser Asn Tyr Thr Ser Gln Ile Tyr Glu Ile Leu Thr Glu Ser 635 630 Gln Asn Gln Gln Asp Arg Asn Glu Lys Asp Leu Leu Glu Leu Asp Lys 650 Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr 665 Ile Lys Ile Phe Ile Ile Ile Val Gly Ser Leu Ile Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser 695 Pro Leu Ser Phe Gln Thr Pro Thr His His Gln Arg Glu Pro Asp Arg 720 705 715 Pro Glu Glu Ile Gly Glu Gly Gly Glu Gln Ser Lys Asp Arg Ser 730 Val Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg 740 745 750 Ser Leu Cys Leu Phe Ser Tyr His Leu Leu Arg Asp Phe Ile Leu Ile 755

Ala Ala Arg Thr Val Glu Leu Leu Gly His Ser Ser Leu Lys Gly Leu

Arg Arg Gly Trp Glu Gly Leu Lys Tyr Leu Gly Asn Leu Leu Tyr

795

800

775

790

785

Trp Gly Gln Glu Ile Lys Ile Ser Ala Ile Ser Leu Leu Asn Ala Thr 805 810 815

Ala Ile Ala Val Ala Gly Trp Thr Asp Arg Val Ile Glu Val Ala Gln 820 825 830

Arg Ala Trp Arg Ala Leu Leu His Ile Pro Arg Arg Ile Arg Gln Gly 835 840 845

Leu Glu Arg Ala Leu Leu 850

<210> 60

<211> 630

<212> PRT

<213> Human immunodeficiency virus

<400> 60

Met Arg Val Lys Glu Thr Gln Met Asn Trp Pro Asn Leu Trp Lys Trp

1 10 15

Gly Thr Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Ser Asp Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Asp
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala His Glu Thr Glu Val 50 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile His Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Arg 85 90 95

Asn Asn Met Val Glu Gln Met Gln Glu Asp Val Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asn Ala Asn Trp Thr Asn Ser Asn Asn Thr Thr Asn Gly 130 135 140

Pro Asn Lys Ile Gly Asn Ile Thr Asp Glu Val Lys Asn Cys Thr Phe 145 150 155 160

Asn Met Thr Thr Glu Leu Lys Asp Lys Gln Lys Val His Ala Leu 165 170 175

Phe Tyr Lys Leu Asp Ile Val Gln Ile Asn Ser Ser Glu Tyr Arg Leu 180 185 190

Ile Asn Cys Asn Thr Ser Val Ile Lys Gln Ala Cys Pro Lys Ile Ser 195 200 205

Phe	Asp 210	Pro	Ile	Pro	Ile	His 215	Tyr	Cys	Thr	Pro	Ala 220	Gly	Tyr	Ala	Ile
Leu 225	Lys	Cys	Asn	Asp	Lys 230	Asn	Phe	Asn	Gly	Thr 235	Gly	Pro	Cys	Lys	Asn 240
Val	Ser	Ser	Val	Gln 245	Cys	Thr	His	Gly	Ile 250	Lys	Pro	Val	Val	Ser 255	Thr
Gln	Leu	Leu	Leu 260	Asn	Gly	Ser	Leu	Ala 265	Glu	Glu	Glu	Ile	Ile 270	Ile	Arg
Ser	Glu	Asn 275	Leu	Thr	Asn	Asn	Ala 280	Lys	Thr	Ile	Ile	Val 285	His	Leu	Asn
Lys	Ser 290	Val	Glu	Ile	Asn	Cys 295	Thr	Arg	Pro	Ser	Asn 300	Asn	Thr	Arg	Thr
Ser 305	Ile	Thr	Met	Gly	Pro 310	Gly	Gln	Val	Phe	Tyr 315	Arg	Thr	Gly	Asp	Ile 320
Ile	Gly	Asp	Ile	Arg 325	Lys	Ala	Tyr	Cys	Glu 330	Ile	Asn	Gly	Ile	Lys 335	Trp
Asn	Glu	Val	Leu 340	Val	Gln	Val	Thr	Gly 345	Lys	Leu	Lys	Glu	His 350	Phe	Asn
Lys	Thr	Ile 355	Ile	Phe	Gln	Pro	Pro 360	Ser	Gly	Gly	Asp	Leu 365	Glu	Ile	Ile
Thr	His 370	His	Phe	Ser	Cys	Arg 375	Gly	Glu	Phe	Phe	Tyr 380	Cys	Asn	Thr	Thr
Lys 385	Leu	Phe	Asn	Asn	Thr 390	Cys	Ile	Gly	Asn	Thr 395	Ser	Met	Glu	Gly	Cys 400
Asn	Asn	Thr	Ile	Ile 405	Leu	Pro	Cys	Lys	Ile 410	Lys	Gln	Ile	Ile	Asn 415	Met
Trp	Gln	Gly	Val 420	Gly	Gln	Ala	Met	Tyr 425	Ala	Pro	Pro	Ile	Ser 430	Gly	Arg
Ile	Asn	Cys 435	Val	Ser	Asn	Ile	Thr 440	Gly	Ile	Leu	Leu	Thr 445	Arg	Asp	Gly
Gly	Ala 450	Asp	Asn	Asn	Thr	Thr 455	Asn	Glu	Thr	Phe	Arg 460	Pro	Gly	Gly	Gly
Asn 465	Ile	Lys	Asp	Asn	Trp 470	Arg	Ser	Glu	Leu	Tyr 475	Lys	Tyr	Lys	Val	Val 480
Glu	Ile	Glu	Pro	Leu 485	Gly	Ile	Ala	Pro	Thr 490	Arg	Ala	Arg	Thr	Leu 495	Thr
Val	Gln	Ala	Arg 500	Gln	Leu	Leu	Ser	Gly 505	Ile	Val	Gln	Gln	Gln 510	Ser	Asn

Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val 515 520 525

Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr 530 540

Leu Lys Asp Gln Lys Phe Leu Gly Leu Trp Gly Cys Ser Gly Lys Ile 545 550 555 560

Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser 565 570 575

Phe Glu Glu Ile Trp Asp Asn Met Thr Trp Ile Glu Trp Glu Arg Glu 580 585 590

Ile Ser Asn Tyr Thr Ser Gln Ile Tyr Glu Ile Leu Thr Glu Ser Gln
595 600 605

Asn Gln Gln Asp Arg Asn Glu Lys Asp Leu Leu Glu Leu Asp Lys Trp 610 615 620

Ala Ser Leu Trp Asn Trp 625 630

<210> 61

<211> 1921

<212> DNA

<213> Human immunodeficiency virus

<400> 61

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<210> 62

<211> 854

<212> PRT

<213> Human immunodeficiency virus

<400> 62

Met Arg Val Lys Gly Ile Gln Arg Asn Trp Gln His Leu Trp Asn Trp

1 5 10 15

Gly Ile Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Glu Lys Leu 20 25 30

Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Glu Asp Ala Asn Ala
35 40 45

Pro Leu Phe Cys Ála Ser Asp Ala Lys Ala His Ser Thr Glu Ser His 50 55 60

Asn Ile Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Ser Pro Gln 65 70 75 80

Glu Ile Asn Met Arg Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn
85 90 95

Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu 100 105 110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn 115 120 125

Cys Thr Glu Ile Asn Asn Ser Thr Arg Asn Ile Thr Glu Glu Tyr 130 135 140

Arg Met Thr Asn Cys Ser Phe Asn Met Thr Thr Glu Leu Arg Asp Lys 145 150 155 160

Lys Lys Ala Glu Tyr Ala Leu Phe Tyr Arg Thr Asp Val Val Pro Ile 165 170 175

Asn Glu Met Asn Asn Glu Asn Asn Gly Thr Asn Ser Thr Trp Tyr Arg 180 185 190

Leu Thr Asn Cys Asn Val Ser Thr Ile Lys Gln Ala Cys Pro Lys Val 195 200 205

Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala 210 215 220

Ile 225	Leu	Lys	Cys	Val	Asp 230	Lys	Lys	Phe	Asn	Gly 235	Thr	Gly	Thr	Cys	Asn 240
Asn	Val	Ser	Thr	Val 245	Gln	Cys	Thr	His	Gly 250	Ile	Lys	Pro	Val	Val 255	Ser
Thr	Gln	Leu	Leu 260	Leu	Asn	Gly	Ser	Leu 265	Ala	Glu	Lys	Asp	Ile 270	Ile	Ile
Ser	Ser	Glu 275	Asn	Ile	Ser	Asp	Asn 280	Ala	Lys	Val	Ile	Ile 285	Val	His	Leu
Asn	Arg 290	Ser	Val	Glu	Ile	Asn 295	Сув	Thr	Arg	Pro	Asn 300	Asn	Asn	Thr	Arg
Arg 305	Ser	Val	Ala	Ile	Gly 310	Pro	Gly	Gln	Ala	Phe 315	Tyr	Thr	Thr	Gly	Glu 320
Val	Ile	Gly	Asp	Ile 325	Arg	Lys	Ala	His	Cys 330	Asn	Val	Ser	Trp	Thr 335	Lys
Trp	Asn	Glu	Thr 340	Leu	Arg	Asp	Val	Gln 345	Ala	Lys	Leu	Gln	Glu 350	Tyr	Phe
Ile	Asn	Lys 355	Ser	Ile	Glu	Phe	Asn 360	Ser	Ser	Ser	Gly	Gly 365	Asp	Leu	Glu
Ile	Thr 370	Thr	His	Ser	Phe	Asn 375	Cys	Gly	Gly	Glu	Phe 380	Phe	Tyr	Cys	Asn
Thr 385	Ser	Gly	Leu	Phe	Asn 390	Asn	Ser	Ile	Leu	Lys 395	Ser	Asn	Ile	Ser	Glu 400
Asn	Asn	Asp	Thr	Ile 405	Thr	Leu	Asn	Cys	Lys 410	Ile	Lys	Gln	Ile	Val 415	Arg
Met	Trp	Gln	Arg 420	Val	Gly	Gln	Ala	Met 425	Tyr	Ala	Pro	Pro	Ile 430	Ala	Gly
Asn	Ile	Thr 435	Cys	Arg	Ser	Asn	Ile 440	Thr	Gly	Leu	Ile	Leu 445	Thr	Arg	Asp
Gly	Gly 450	Asp	Asn	Asn	Ser	Thr 455	Ser	Glu	Ile	Phe	Arg 460	Pro	Gly	Gly	Gly
Asp 465	Met	Lys	Asn	Asn	Trp 470	Arg	Ser	Glu	Leu	Tyr 475	Lys	Tyr	Lys	Thr	Val 480
Lys	Ile	Lys	Ser	Leu 485	Gly	Ile	Ala	Pro	Thr 490	Arg	Ala	Arg	Arg	Arg 495	Val
Val	Glu	Arg	Glu 500	Lys	Arg	Ala	Val	Gly 505	Val	Gly	Ala	Ile	Phe 510	Leu	Gly
Phe	Leu	Gly 515	Thr	Ala	Gly	Ser	Thr 520	Met	Gly	Ala	Ala	Ser 525	Ile	Thr	Leu

Thr Val Gln Val Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser 535 Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr 555 Val Trp Gly Ile Lys Gln Leu Arg Ala Arg Val Leu Ala Leu Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys 585 Leu Ile Cys Thr Thr Asn Val Pro Trp Asn Thr Ser Trp Ser Asn Lys Ser Tyr Asn Glu Ile Trp Glu Asn Met Thr Trp Ile Glu Trp Glu Arg 615 Glu Ile Asp Asn Tyr Thr Tyr His Ile Tyr Ser Leu Ile Glu Gln Ser 635 Gln Ile Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Gln 645 Trp Ala Ser Leu Trp Ser Trp Phe Ser Ile Ser Asn Trp Leu Trp Tyr 665 Ile Arg Ile Phe Val Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile 675 Val Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Leu His His Gln Arg Glu Pro Asp Arg 715 Pro Ala Gly Ile Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg 745 Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile 755 Ala Ala Arg Thr Val Glu Leu Leu Gly Arg Asn Ser Leu Lys Gly Leu Arg Leu Gly Trp Glu Ala Leu Lys Tyr Leu Trp Asn Leu Leu Leu Tyr 795 790 Trp Ala Arg Glu Leu Lys Asn Ser Ala Ile Asn Leu Leu Asp Thr Ile

Ala Ile Ala Val Ala Asn Trp Thr Asp Arg Val Ile Glu Val Ala Gln 825

820

830

Arg Ala Gly Arg Ala Val Leu Asn Ile Pro Arg Arg Ile Arg Gln Gly 835 840 845

Leu Glu Arg Ala Leu Leu 850

<210> 63

<211> 630

<212> PRT

<213> Human immunodeficiency virus

<400> 63

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Gly Ile Leu Ile Leu Gly Leu Val Ile Ile Cys Ser Ala Glu Lys Leu 20 25 30

Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Glu Asp Ala Asn Ala
35 40 45

Pro Leu Phe Cys Ala Ser Asp Ala Lys Ala His Ser Thr Glu Ser His 50 55 60

Asn Ile Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Ser Pro Gln 65 70 75 80

Glu Ile Asn Met Arg Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn 85 90 95

Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Glu 100 105 110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn 115 120 125

Cys Thr Glu Ile Asn Asn Asn Ser Thr Arg Asn Ile Thr Glu Glu Tyr 130 135 140

Arg Met Thr Asn Cys Ser Phe Asn Met Thr Thr Glu Leu Arg Asp Lys 145 150 155 160

Lys Lys Ala Glu Tyr Ala Leu Phe Tyr Arg Thr Asp Val Val Pro Ile 165 170 175

Asn Glu Met Asn Asn Glu Asn Asn Gly Thr Asn Ser Thr Trp Tyr Arg 180 185 190

Leu Thr Asn Cys Asn Val Ser Thr Ile Lys Gln Ala Cys Pro Lys Val 195 200 205

Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala 210 215 220

Ile Leu Lys Cys Val Asp Lys Lys Phe Asn Gly Thr Gly Thr Cys Asn

Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser 245 250 255

Thr Gln Leu Leu Asn Gly Ser Leu Ala Glu Lys Asp Ile Ile 260 265 270

Ser Ser Glu Asn Ile Ser Asp Asn Ala Lys Val Ile Ile Val His Leu 275 280 285

Asn Arg Ser Val Glu Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg 290 295 300

Arg Ser Val Ala Ile Gly Pro Gly Gln Ala Phe Tyr Thr Thr Gly Glu 305 310 315 320

Val Ile Gly Asp Ile Arg Lys Ala His Cys Asn Val Ser Trp Thr Lys 325 330 335

Trp Asn Glu Thr Leu Arg Asp Val Gln Ala Lys Leu Gln Glu Tyr Phe 340 345 350

Ile Asn Lys Ser Ile Glu Phe Asn Ser Ser Ser Gly Gly Asp Leu Glu 355 360 365

Ile Thr Thr His Ser Phe Asn Cys Gly Glu Phe Phe Tyr Cys Asn 370 375 380

Thr Ser Gly Leu Phe Asn Asn Ser Ile Leu Lys Ser Asn Ile Ser Glu 385 390 395 400

Asn Asn Asp Thr Ile Thr Leu Asn Cys Lys Ile Lys Gln Ile Val Arg
405 410 415

Met Trp Gln Arg Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ala Gly
420 425 430

Asn Ile Thr Cys Arg Ser Asn Ile Thr Gly Leu Ile Leu Thr Arg Asp 435 440 445

Gly Gly Asp Asn Asn Ser Thr Ser Glu Ile Phe Arg Pro Gly Gly Gly 450 455 460

Asp Met Lys Asn Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Thr Val 465 470 475 480

Lys Ile Lys Ser Leu Gly Ile Ala Pro Thr Arg Ala Arg Thr Leu Thr 485 490 495

Val Gln Val Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn 500 505 510

Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val 515 520 525

Trp Gly Ile Lys Gln Leu Arg Ala Arg Val Leu Ala Leu Glu Arg Tyr

530 535 540

Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu 560

Ile Cys Thr Thr Asn Val Pro Trp Asn Thr Ser Trp Ser Asn Lys Ser Tyr Asn Glu Ile Trp Glu Asn Met Thr Trp Ile Glu Trp Glu Arg Glu 580

Ile Asp Asn Tyr Thr Tyr His Ile Tyr Ser Leu Ile Glu Gln Ser Gln 605

Ile Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Gln Trp 610

Ala Ser Leu Trp Ser Trp 630

<210> 64 <211> 1921 <212> DNA <213> Human immunodeficiency virus

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attatacata ccatatatac tctctcatcg aacaatctca gatacaacag gaaaagaatg 1860 aacaagattt gttggctctt gaccaatggg cttctttgtg gagttggtaa agatcttaca 1920 a

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230

Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala

235

Glu Glu Glu Ile Ile Arg Ser Glu Asn Ile Thr Asn Asn Ala Lys 265 Thr Ile Ile Val Gln Leu Asn Glu Ser Val Glu Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser Arg Thr Lys Trp Asn Lys Thr Leu Gln Gln Val Ala Lys Lys Leu Arg Glu His Phe Asn Lys Thr Ile Ile Phe Asn Pro Ser Ser 340 345 Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly Gly Glu 360 Phe Phe Tyr Cys Asn Thr Ser Glu Leu Phe Asn Ser Thr Trp Asn Gly 375 Thr Asn Asn Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn 385 Met Trp Gln Gly Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Glu Gly Lys Ile Arg Cys Thr Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp 420 Gly Gly Asn Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile 455 Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Glu 465 480 Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arq Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu 515 Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp

Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu

Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile 565 570 575

Cys Thr Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Gln 580 585 590

Asp Glu Ile Trp Asp Asn Met Thr Trp Met Glu Trp Asp Lys Glu Ile 595 600 605

Asn Asn Tyr Thr Asp Ile Ile Tyr Ser Leu Ile Glu Glu Ser Gln Asn 610 620

Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Ala Leu Asp Lys Trp Ala 625 630 635 640

Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys
645 650 655

Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val Phe
660 665 670

Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu 675 680 685

Ser Phe Gln Thr Leu Ile Pro Asn Pro Arg Gly Pro Asp Arg Pro Glu 690 695 700

Gly Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile Arg 705 710 715 720

Leu Val Asn Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg Ser Leu
725 730 735

Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Leu Ile Leu Ile Ala Ala 740 745 750

Arg Thr Val Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr 755 760 765

Leu Trp Asn Leu Leu Gln Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala 770 780

Ile Ser Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Glu Gly Thr Asp
785 790 795 800

Arg Val Ile Glu Val Val Gln Arg Val Cys Arg Ala Ile Leu Asn Ile 805 810 815

Pro Arg Arg Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu 820 825

<210> 66

<211> 830

<212> PRT

<400> 66

Met Arg Val Met Gly Ile Gln Arg Asn Cys Gln His Leu Trp Arg Trp 1 5 10 15

Gly Ile Leu Ile Phe Gly Met Leu Met Ile Cys Ser Ala Ala Glu Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Asn 35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val
50 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Val Asn Ala Thr Asn Asn Ser Thr Asn Met Gly Glu 130 135 140

Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp Lys Lys 145 150 155 160

Gln Lys Val Tyr Ala Leu Phe Tyr Arg Leu Asp Val Val Pro Ile Asn 165 170 175

Asp Asn Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr 180 185 190

Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys 195 200 205

Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe Asn 210 215 220

Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys Thr His Gly
225 230 235 240

Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala 245 250 255

Glu Glu Glu Ile Ile Ile Arg Ser Glu Asn Ile Thr Asp Asn Ala Lys 260 265 270

Thr Ile Ile Val Gln Leu Asn Glu Ser Val Glu Ile Asn Cys Thr Arg 275 280 285 Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser Gly Ala Glu Trp Asn Lys Thr Leu Gln Gln Val Ala Ala Lys Leu Arg Glu His Phe Asn Asn Lys Thr Ile Ile Phe Lys Pro Ser 345 Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly Gly 360 Glu Phe Phe Tyr Cys Asn Thr Ser Gly Leu Phe Asn Ser Thr Trp Asn 370 375 Gly Thr Asn Glu Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Val 390 Asn Met Trp Gln Arg Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Ala 410 Gly Asn Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg 420 Asp Gly Gly Thr Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys 450 455 Ile Glu Pro Leu Gly Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val 470 465 475 Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe 490 Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr 500 Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arq Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr 545 Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu 570 Ile Cys Thr Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser 590 580

Gln Asp Glu Ile Trp Asp Asn Met Thr Trp Met Gln Trp Glu Arg Glu
595 600 605

Ile Ser Asn Tyr Thr Asp Ile Ile Tyr Ser Leu Ile Glu Glu Ser Gln 610 620

Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys Trp 625 630 635 640

Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile 645 650 655

Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Val 660 665 670

Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro 675 680 685

Leu Ser Phe Gln Thr Leu Ile Pro Asn Pro Arg Gly Pro Asp Arg Pro 690 695 700

Gly Gly Ile Glu Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile 705 710 715 720

Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg Ser 725 730 735

Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile Ala 740 745 750

Ala Arg Thr Val Glu Leu Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys
755 760 765

Tyr Leu Trp Asn Leu Leu Gln Tyr Trp Gly Gln Glu Leu Lys Asn Ser 770 775 780

Ala Ile Ser Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Glu Gly Thr 785 790 795 800

Asp Arg Val Ile Glu Val Val Gln Arg Ala Cys Arg Ala Ile Leu His 805 810 815

Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu 820 825 830

<210> 67

<211> 2493

<212> DNA

<213> Human immunodeficiency virus

<400> 67

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<211> 845
<212> PRT
<213> Human immunodeficiency virus
<400> 68
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<210> 68

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Gln	Ser	Leu 115	Lys	Pro	Cys	Val	Lys 120	Leu	Thr	Pro	Leu	Cys 125	Val	Thr	Leu
Asn	Cys 130	Ser	Asn	Val	Asn	Val 135	Thr	Asn	Asn	Thr	Thr 140	Asn	Thr	His	Glu
Glu 145	Glu	Ile	Lys	Asn	Cys 150	Ser	Phe	Asn	Met	Thr 155	Thr	Glu	Leu	Arg	Asp 160
Lys	Lys	Gln	Lys	Val 165	Tyr	Ser	Leu	Phe	Tyr 170	Arg	Leu	Asp	Val	Val 175	Gln
Ile	Asn	Glu	Asn 180	Asn	Ser	Asn	Ser	Ser 185	Tyr	Arg	Leu	Ile	Asn 190	Cys	Asn
Thr	Ser	Ala 195	Ile	Thr	Gln	Ala	Cys 200	Pro	Lys	Val	Ser	Phe 205	Glu	Pro	Ile
Pro	Ile 210	His	Tyr	Cys	Ala	Pro 215	Ala	Gly	Phe	Ala	Ile 220	Leu	Lys	Cys	Lys
Asp 225	Lys	Glu	Phe	Asn	Gly 230	Thr	Gly	Pro	Cys	Lys 235	Asn	Val	Ser	Thr	Val 240
Gln	Cys	Thr	His	Gly 245	Ile	Lys	Pro	Val	Val 250	Ser	Thr	Gln	Leu	Leu 255	Leu
Asn	Gly	Ser	Leu 260	Ala	Glu	Glu	Glu	Val 265	Ile	Ile	Arg	Ser	Glu 270	Asn	Ile
Thr	Asn	Asn 275	Ala	Lys	Thr	Ile	Ile 280	Val	Gln	Leu	Thr	Lys 285	Pro	Val	Lys
Ile	Asn 290	Суѕ	Thr	Arg	Pro	Asn 295	Asn	Asn	Thr	Arg	Lys 300	Ser	Ile	Arg	Ile
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Arg	Gln	Ala	His	Cys 325	Asn	Val	Ser	Arg	Ser 330	Glu	Trp	Asn	Lys	Thr 335	Leu
Gln	Lys	Val	Ala 340	Lys	Gln	Leu	Arg	Lys 345	Tyr	Phe	Lys	Asn	Lys 350	Thr	Ile
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Phe	Asn 370	Cys	Gly	Gly	Glu	Phe 375	Phe	Tyr	Cys	Asn	Thr 380	Ser	Gly	Leu	Phe	
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Cys	Arg	Ile	Lys	Gln 405	Ile	Ile	Asn	Met	Trp 410	Gln	Arg	Ala	Gly	Gln 415	Ala	
Met	Tyr	Ala	Pro 420	Pro	Ile	Gln	Gly	Val 425	Ile	Arg	Cys	Glu	Ser 430	Asn	Ile	
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Thr	Phe 450	Arg	Pro	Gly	Gly	Gly 455	Asp	Met	Arg	Asp	Asn 460	Trp	Arg	Ser	Glu	
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Thr	Arg	Ala	Lys	Arg 485	Arg	Val	Val	Glu	Arg 490	Glu	Lys	Arg	Ala	Val 495	Gly	
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Gly	Ala	Ala 515	Ser	Ile	Thr	Leu	Thr 520	Val	Gln	Ala	Arg	Gln 525	Leu	Leu	Ser	
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Asn	Ser	Ser 595	Trp	Ser	Asn	Lys	Ser 600	Gln	Asn	Glu	Ile	Trp 605	Asp	Asn	Met	
Thr	Trp 610	Leu	Gln	Trp	Asp	Lys 615	Glu	Ile	Ser	Asn	Tyr 620	Thr	His	Ile	Ile	
Tyr 625	Asn	Leu	Ile	Glu	Glu 630	Ser	Gln	Asn	Gln	Gln 635	Glu	Lys	Asn	Glu	Gln 640	
Asp	Leu	Leu	Ala	Leu 645	Asp	Lys	Trp	Ala	Asn 650	Leu	Trp	Asn	Trp	Phe 655	Asp	
Ile	Ser	Asn	Trp 660	Leu	Trp	Tyr	Ile	Lys 665	Ile	Phe	Ile	Met	Ile 670	Val	Gly	

Gly Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Ser Val Ile Asn 675 680 685

Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr His Thr Pro 690 695 700

Asn Pro Arg Gly Leu Asp Arg Pro Gly Arg Ile Glu Glu Glu Gly Gly 705 710 715 720

Glu Gln Gly Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala
725 730 735

Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg
740 745 750

Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly 755 760 765

His Ser Ser Leu Lys Gly Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr
770 780

Leu Trp Asn Leu Leu Tyr Trp Gly Arg Glu Leu Lys Ile Ser Ala 785 790 795 800

Ile Asn Leu Val Asp Thr Ile Ala Ile Ala Val Ala Gly Trp Thr Asp 805 810 815

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Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu 835 840 845

<210> 69

<211> 845

<212> PRT

<213> Human immunodeficiency virus

<400> 69

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35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Asp Leu Glu Asn Val Thr Glu Glu Phe Asn Met Trp Lys
85 90 95

Asn	Asn	Met	Val 100	Glu	Gln	Met	His	Ala 105	Asp	Ile	Ile	Ser	Leu 110	Trp	Asp
Gln	Ser	Leu 115	Lys	Pro	Суз	Val	Lys 120	Leu	Thr	Pro	Leu	Cys 125	Val	Thr	Leu
Asn	Cys 130	Ser	Asn	Val	Asn	Val 135	Thr	Asn	Asn	Thr	Thr 140	Asn	Thr	His	Glu
Glu 145	Glu	Ile	Lys	Asn	Cys 150	Ser	Phe	Asn	Met	Thr 155	Thr	Glu	Leu	Arg	Asp 160
Lys	Lys	Gln	Lys	Val 165	Tyr	Ser	Leu	Phe	Tyr 170	Arg	Leu	Asp	Val	Val 175	Pro
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Thr	Ser	Ala 195	Ile	Thr	Gln	Ala	Cys 200	Pro	Lys	Val	Ser	Phe 205	Glu	Pro	Ile
Pro	Ile 210	His	Tyr	Cys	Ala	Pro 215	Ala	Gly	Phe	Ala	Ile 220	Leu	Lys	Cys	Lys
Asp 225	Lys	Glu	Phe	Asn	Gly 230	Thr	Gly	Pro	Cys	Lys 235	Asn	Val	Ser	Thr	Val 240
Gln	Cys	Thr	His	Gly 245	Ile	Lys	Pro	Val	Val 250	Ser	Thr	Gln	Leu	Leu 255	Leu
Asn	Gly	Ser	Leu 260	Ala	Glu	Glu	Glu	Val 265	Met	Ile	Arg	Ser	Glu 270	Asn	Ile
Thr	Asp	Asn 275	Ala	Lys	Thr	Ile	Ile 280	Val	Gln	Leu	Thr	Glu 285	Pro	Val	Lys
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Cys	Arg	Ile	Lys	Gln 405	Ile	Ile	Asn	Met	Trp 410	Gln	Arg	Val	Gly	Gln 415	Ala
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Thr	Phe 450	Arg	Pro	Gly	Gly	Gly 455	Asp	Met	Arg	Asp	Asn 460	Trp	Arg	Ser	Glu
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Gln 545	His	Leu	Leu	Lys	Leu 550	Thr	Val	Trp	Gly	Ile 555	Lys	Gln	Leu	Gln	Ala 560
Arg	Val	Leu	Ala	Val 565	Glu	Arg	Tyr	Leu	Lys 570	Asp	Gln	Gln	Leu	Leu 575	Gly
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Asn	Ser	Ser 595	Trp	Ser	Asn	Lys	Ser 600	Gln	Asp	Glu	Ile	Trp 605	Asp	Asn	Met
Thr	Trp 610	Leu	Gln	Trp	Asp	Lys 615	Glu	Ile	Ser	Asn	Tyr 620	Thr	Asp	Ile	Ile
Tyr 625	Asn	Leu	Ile	Glu	Glu 630	Ser	Gln	Asn	Gln	Gln 635	Glu	Lys	Asn	Glu	Gln 640
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Gly	Leu	Ile 675	Gly	Leu	Arg	Ile	Val 680	Phe	Ala	Val	Leu	Ser 685	Val	Ile	Asn
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Glu Gln Gly Arg Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala
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Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg
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Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly
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Arg Ser Ser Leu Lys Gly Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr
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Leu Trp Asn Leu Leu Tyr Trp Gly Arg Glu Leu Lys Ile Ser Ala
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                                        795
785
Ile Asn Leu Leu Asp Thr Ile Ala Ile Ala Val Ala Gly Trp Thr Asp
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                                                        815
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<210> 70
<211> 2538
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<212> DNA <213> Human immunodeficiency virus

<400> 70

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<210> 71 <211> 2538 <212> DNA <213> Human immunodeficiency virus

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<212> PRT

<213> Human immunodeficiency virus

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Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His 50

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln 70

Glu Val Asn Leu Glu Asn Val Thr Glu Asp Phe Asn Met Trp Lys Asn 90 95

Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln 100

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn 120 125

Cys Ser Asn Ala Asn Thr Thr Asn Asn Ser Thr Met Glu Glu Ile Lys 135 130

Asn Cys Ser Tyr Asn Ile Thr Thr Glu Leu Arg Asp Lys Thr Gln Lys 155 145 150

Val Tyr Ser Leu Phe Tyr Lys Leu Asp Val Val Gln Leu Asp Glu Ser 170 165

Asn Lys Ser Glu Tyr Tyr Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala 185 180

Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His 200

Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Lys Asp Pro Arg

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Cys	Asn	Ile	Asn	Lys 325	Thr	Lys	Trp	Asn	Ala 330	Thr	Leu	Gln	Lys	Val 335	Ala
Glu	Gln	Leu	Arg 340	Glu	His	Phe	Pro	Asn 345	Lys	Thr	Ile	Ile	Phe 350	Thr	Asn
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Lys 385	Asn	Gly	Thr	Thr	Asn 390	Asn	Thr	Glu	Gln	Met 395	Ile	Thr	Leu	Pro	Cys 400
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Tyr	Ala	Pro	Pro 420	Ile	Ala	Gly	Val	Ile 425	Lys	Cys	Thr	Ser	Asn 430	Ile	Thr
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Lys 465	Tyr	Lys	Val	Val	Lys 470	Ile	Glu	Pro	Leu	Gly 475	Val	Ala	Pro	Thr	Arg 480
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<210> 74

<211> 841

<212> PRT

<213> Human immunodeficiency virus

<400> 74

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35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val 50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Val Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Leu Met Asn Ala Thr Asn Thr Asn Thr Thr Ile Ile 130 135 140

Tyr Arg Trp Arg Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr 145 150 155 160

Ser Ile Arg Asp Lys Val Gln Lys Glu Tyr Ala Leu Phe Tyr Lys Leu 165 170 175

Asp Val Val Pro Ile Asp Asn Asp Asn Thr Ser Tyr Arg Leu Ile Ser 180 185 190

Cys Asn Thr Ser Val Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu 195 200 205

Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys 210 215 220

Cys Asn Asp Lys Lys Phe Asn Gly Thr Gly Pro Cys Thr Asn Val Ser 225 230 235 240

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- Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Val Val Ile Arg Ser Glu 260 265 270
- Asn Phe Thr Asp Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Glu Ser 275 280 285
- Val Glu Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile 290 295 300
- His Ile Gly Pro Gly Arg Ala Phe Tyr Thr Thr Gly Glu Ile Ile Gly 305 310 315 320
- Asp Ile Arg Gln Ala His Cys Asn Ile Ser Arg Ala Lys Trp Asn Asn 325 330 335
- Thr Leu Lys Gln Ile Val Lys Lys Leu Arg Glu Gln Phe Gly Asn Lys 340 345 350
- Thr Ile Val Phe Asn Gln Ser Ser Gly Gly Asp Pro Glu Ile Val Met 355 360 365
- His Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Thr Gln 370 375 380
- Leu Phe Asn Ser Thr Trp Asn Gly Thr Trp Asn Asn Thr Glu Gly Asn 385 390 395 400
- Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Glu 405 410 415
- Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Arg Gly Gln Ile Arg Cys
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- Ser Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn 435 440 445
- Glu Thr Glu Ile Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp 450 455 460
- Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly 465 470 475 480
- Val Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg 485 490 495
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- Ser Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln 515 520 525
- Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile 530 540

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<213> Human immunodeficiency virus
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25

20

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His 65	Asn	Val	Trp	Ala	Thr 70	His	Ala	Cys	Val	Pro 75	Thr	Asp	Pro	Asn	Pro 80
Gln	Glu	Val	Val	Leu 85	Glu	Asn	Val	Thr	Glu 90	Asn	Phe	Asn	Met	Trp 95	Lys
Asn	Asn	Met	Val 100	Glu	Gln	Met	His	Glu 105	Asp	Ile	Ile	Ser	Leu 110	Trp	Asp
Gln	Ser	Leu 115	Lys	Pro	Cys	Val	Lys 120	Leu	Thr	Pro	Leu	Cys 125	Val	Thr	Leu
Asn	Cys 130	Thr	Asp	Leu	Leu	Asn 135	Ala	Thr	Asn	Thr	Asn 140	Ser	Thr	Asn	Met
Tyr 145	Arg	Trp	Arg	Gly	Glu 150	Ile	Lys	Asn	Cys	Ser 155	Phe	Asn	Ile	Thr	Thr 160
Ser	Ile	Arg	Asp	Lys 165	Met	Gln	Lys	Glu	Tyr 170	Ala	Leu	Phe	Tyr	Lys 175	Leu
Asp	Val	Val	Pro 180	Ile	Asp	Asn	Asn	Thr 185	Ser	Tyr	Arg	Leu	Ile 190	Asn	Cys
Asn	Thr	Ser 195	Val	Ile	Thr	Gln	Ala 200	Cys	Pro	Lys	Val	Ser 205	Phe	Glu	Pro
Ile	Pro 210	Ile	His	Tyr	Cys	Thr 215	Pro	Ala	Gly	Phe	Ala 220	Ile	Leu	Lys	Cys
Asn 225	Asp	Lys	Lys	Phe	Asn 230	Gly	Thr	Gly	Pro	Cys 235	Lys	Asn	Val	Ser	Thr 240
Val	Gln	Cys	Thr	His 245	Gly	Ile	Arg	Pro	Val 250	Val	Ser	Thr	Gln	Leu 255	Leu
Leu	Asn	Gly	Ser 260	Leu	Ala	Glu	Glu	Glu 265	Val	Val	Ile	Arg	Ser 270	Glu	Asn
Phe	Thr	Asp 275	Asn	Ala	Lys	Thr	Ile 280	Ile	Val	Gln	Leu	Asn 285	Glu	Ser	Val
Glu	Ile 290	Asn	Cys	Thr	Arg	Pro 295	Asn	Asn	Asn	Thr	Arg 300	Lys	Ser	Ile	His
Ile 305	Gly	Pro	Gly	Arg	Ala 310	Phe	Tyr	Ala	Thr	Gly 315	Glu	Ile	Ile	Gly	Asp 320
Ile	Arg	Gln	Ala	His 325	Cys	Asn	Leu	Ser	Arg 330	Ala	Lys	Trp	Asn	Asn 335	Thr

- Leu Lys Gln Val Val Thr Lys Leu Arg Glu Gln Phe Asp Asn Lys Thr 340 345 350
- Ile Val Phe Asn Pro Ser Ser Gly Gly Asp Pro Glu Ile Val Met His 355 360 365
- Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Thr Gln Leu 370 375 380
- Phe Asn Ser Thr Trp Asn Gly Thr Trp Asn Asn Thr Glu Gly Asn Ile 385 390 395 400
- Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Glu Val 405 410 415
- Gly Lys Ala Met Tyr Ala Pro Pro Ile Arg Gly Gln Ile Arg Cys Ser 420 425 430
- Ser Asn Ile Thr Gly Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn Glu
 435 440 445
- Thr Glu Ile Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg 450 455 460
- Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val 465 470 475 480
- Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg Ala
 485 490 495
- Val Gly Ile Gly Ala Met Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser 500 505 510
- Thr Met Gly Ala Ala Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu 515 520 525
- Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu 530 540
- Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu 545 550 555 560
- Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Arg Asp Gln Gln Leu 565 570 575
- Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Thr Val 580 585 590
- Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Asp Glu Ile Trp Asn 595 600 605
- Asn Met Thr Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr Gly 610 620
- Leu Ile Tyr Thr Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn 625 635 640

Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp
645 650 655

Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile
660 665 670

Val Gly Gly Leu Val Gly Leu Arg Ile Val Phe Ala Val Leu Ser Ile 675 680 685

Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Arg 690 695 700

Leu Pro Ala Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu 705 710 715 720

Gly Glu Arg Asp Arg Asp Ser Gly Arg Leu Val Asn Gly Phe
725 730 735

Leu Ala Leu Ile Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr 740 745 750

His Arg Leu Arg Asp Leu Leu Leu Ile Val Ala Arg Ile Val Glu Leu
755 760 765

Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr Trp Trp Asn Leu Leu 770 775 780

Gln Tyr Trp Ser Gln Glu Leu Lys Asn Ser Ala Val Ser Leu Leu Asn 785 790 795 800

Ala Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Val Ile Glu Val 805 810 815

Val Gln Arg Ala Cys Arg Ala Ile Leu His Ile Pro Arg Arg Ile Arg 820 825 830

Gln Gly Leu Glu Arg Ala Leu Leu 835 840

<210> 78

<211> 835

<212> PRT

<213> Human immunodeficiency virus

<400> 78

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Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Asn Val Val Gly Asn
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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Lys Glu Val

50

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 75 70 65 Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 105 Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn Cys Thr Asn Ala Thr Asn Ala Thr Asn Thr Met Gly Glu Ile Lys 135 Asn Cys Ser Phe Asn Ile Thr Thr Glu Leu Arg Asp Lys Lys Gln Lys 155 160 Val Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn Glu Asn 170 Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala 185 Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr Cys Ala Pro 195 Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr 215 Gly Pro Cys Asn Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Asn Gly Ser Leu Ala Glu Glu 245 Glu Ile Ile Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile 265 Ile Val His Leu Asn Glu Ser Val Glu Ile Val Cys Thr Arg Pro Asn 275 Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Thr Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile 315 310 Ser Glu Asp Lys Trp Asn Lys Thr Leu Gln Lys Val Ser Lys Lys Leu 325 Lys Glu His Phe Pro Asn Lys Thr Ile Lys Phe Glu Pro Ser Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Arg Gly Glu Phe

Phe Tyr Cys Asn Thr Ser Lys Leu Phe Asn Ser Thr Tyr Asn Ser Thr 370 375 Asn Ser Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Glu Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu Leu Thr Arg Asp Gly Gly Lys Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu Ile Lys 450 Pro Leu Gly Ile Ala Pro Thr Lys Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly 490 Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln 500 Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu Thr Val Trp Gly 530 535 Ile Lys Gln Leu Gln Thr Arg Val Leu Ala Ile Glu Arg Tyr Leu Lys 550 555 Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val Pro Trp Asn Ser Ser Trp Ser Asn Lys Ser Gln Glu 580 Asp Ile Trp Asp Asn Met Thr Trp Met Gln Trp Asp Arg Glu Ile Ser Asn Tyr Thr Asp Thr Ile Tyr Arg Leu Leu Glu Asp Ser Gln Asn Gln 615 Gln Glu Lys Asn Glu Lys Asp Leu Leu Ala Leu Asp Ser Trp Lys Asn 625 Leu Trp Asn Trp Phe Asp Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile 650 Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe Ala 660 665 670

Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser 675 680 685

Phe Gln Thr Leu Thr Pro Asn Pro Arg Gly Pro Asp Arg Leu Gly Arg
690 695 700

Ile Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser Ile Arg Leu 705 710 715 720

Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys
725 730 735

Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg
740 '745 750

Ala Val Glu Leu Leu Gly Arg Ser Ser Leu Arg Gly Leu Gln Arg Gly 755 760 765

Trp Glu Ala Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr Trp Gly Leu
770 780

Glu Leu Lys Lys Ser Ala Ile Ser Leu Leu Asp Thr Ile Ala Ile Ala 785 790 795 800

Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Leu Ile Gln Arg Ile Cys 805 810 815

Arg Ala Ile Arg Asn Ile Pro Arg Ile Arg Gln Gly Phe Glu Ala 820 825 830

Ala Leu Gln 835

<210> 79

<211> 2523

<212> DNA

<213> Human immunodeficiency virus

<400> 79

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<210> 80
<211> 2508
<212> DNA
<213> Human immunodeficiency virus
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<210> 81
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<211> 835

<212> PRT

<213> Human immunodeficiency virus

<400> 81

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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Arg Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Met Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asp Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asn Ala Thr Asn Ala Thr Asn Thr Met Gly Glu Met Lys 130 135 140

Asn Cys Ser Phe Asn Ile Thr Thr Glu Leu Arg Asp Lys Lys Gln Lys

Val Tyr Ala Leu Phe Tyr Arg Leu Asp Ile Val Pro Leu Asn Asp Asn 165 170 175

Asn Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala Ile Thr Gln Ala 180 185 190

Cys Pro Lys Val Ser Phe Asp Pro Ile Pro Ile His Tyr Cys Ala Pro 195 200 205

Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asn Lys Thr Phe Asn Gly Thr 210 215 220

Gly Pro Cys Asn Asn Val Ser Thr Val Gln Cys Thr His Gly Ile Lys 225 230 235 240

Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu 245 250 255

Glu Ile Ile Arg Ser Glu Asn Leu Thr Asp Asn Ala Lys Thr Ile
260 265 270

Ile Val His Leu Asn Glu Ser Val Glu Ile Val Cys Thr Arg Pro Asn 275 280 285

Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly Gln Thr Phe Tyr 290 295 300

Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His Cys Asn Ile 305 310 315 320

Ser Glu Glu Lys Trp Asn Lys Thr Leu Gln Arg Val Gly Glu Lys Leu 325 330 335

Lys Glu His Phe Pro Asn Lys Thr Ile Lys Phe Ala Pro Ser Ser Gly 340 345 350

Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Arg Gly Glu Phe 355 360 365

Phe Tyr Cys Asn Thr Ser Arg Leu Phe Asn Ser Thr Tyr Asn Ser Lys 370 375 380

Asn Ser Thr Ile Thr Leu Pro Cys Arg Ile Lys Gln Ile Ile Asn Met 385 390 395 400

Trp Gln Gly Val Gly Arg Ala Met Tyr Ala Pro Pro Ile Ala Gly Asn 405 410 415

Ile Thr Cys Lys Ser Asn Ile Thr Gly Leu Leu Thr Arg Asp Gly
420 425 430

Gly Lys Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly Asp Met Arg 435 440 445

Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu Ile Lys

Pro 465	Leu	Gly	Ile	Ala	Pro 470	Thr	Glu	Ala	Lys	Arg 475	Arg	Val	Val	Glu	Arg 480
Glu	Lys	Arg	Ala	Val 485	Gly	Ile	Gly	Ala	Val 490	Phe	Leu	Gly	Phe	Leu 495	Gly
Ala	Ala	Gly	Ser 500	Thr	Met	Gly	Ala	Ala 505	Ser	Ile	Thr	Leu	Thr 510	Val	Glr
Ala	Arg	Gln 515	Leu	Leu	Ser	Gly	Ile 520	Val	Gln	Gln	Gln	Ser 525	Asn	Leu	Leu
Arg	Ala 530	Ile	Glu	Ala	Gln	Gln 535	His	Met	Leu	Gln	Leu 540	Thr	Val	Trp	Gly
Ile 545	Lys	Gln	Leu	Gln	Thr 550	Arg	Val	Leu	Ala	Ile 555	Glu	Arg	Tyr	Leu	Lys 560
Asp	Gln	Gln	Leu	Leu 565	Gly	Ile	Trp	Gly	Cys 570	Ser	Gly	Lys	Leu	Ile 575	Cys
Thr	Thr	Ala	Val 580	Pro	Trp	Asn	Ser	Ser 585	Trp	Ser	Asn	Lys	Ser 590	Gln	Glı
Glu	Ile	Trp 595	Asp	Asn	Met	Thr	Trp 600	Met	Gln	Trp	Asp	Arg 605	Glu	Ile	Ser
Asn	Tyr 610	Thr	Asp	Thr	Ile	Tyr 615	Arg	Leu	Leu	Glu	Asp 620	Ser	Gln	Asn	Glr
Gln 625	Glu	Lys	Asn	Glu	Gln 630	Asp	Leu	Leu	Ala	Leu 635	Asp	Ser	Trp	Glu	Asr 640
Leu	Trp	Asn	Trp	Phe 645	Asp	Ile	Thr	Asn	Trp 650	Leu	Trp	Tyr	Ile	Lys 655	Il€
Phe	Ile	Met	Ile 660	Val	Gly	Gly	Leu	Ile 665	Gly	Leu	Arg	Ile	Ile 670	Phe	Ala
Val	Leu	Ser 675	Ile	Val	Asn	Arg	Val 680	Arg	Gln	Gly	Tyr	Ser 685	Pro	Leu	Sei
Phe	Gln 690	Thr	Leu	Thr	Pro	Asn 695	Pro	Arg	Gly	Pro	Asp 700	Arg	Leu	Gly	Arg
Ile 705	Glu	Glu	Glu	Gly	Gly 710	Glu	Gln	Asp	Arg	Asp 715	Arg	Ser	Ile	Arg	Le: 720
Val	Ser	Gly	Phe	Leu 725	Ala	Leu	Ala	Trp	Asp 730	Asp	Leu	Arg	Ser	Leu 735	Cys
Leu	Phe	Ser	Tyr 740	His	Arg	Leu	Arg	Asp 745	Phe	Ile	Leu	Ile	Ala 750	Ala	Arg
Δla	Va l	Glu	Leu	Leu	Glv	Ara	Ser	Ser	Leu	Ara	Glv	Leu	Gln	Arq	Glv

755 760 765

Trp Glu Ala Leu Lys Tyr Leu Gly Ser Leu Val Gln Tyr Trp Gly Leu 770 775 780

Glu Leu Lys Lys Ser Ala Ile Ser Leu Leu Asp Thr Ile Ala Ile Ala 785 790 795 800

Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Leu Ile Gln Arg Ile Cys 805 810 815

Arg Ala Ile Arg Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Ala 820 825 830

Ala Leu Leu

<210> 82

<211> 840

<212> PRT

<213> Human immunodeficiency virus

<400> 82

Met Arg Val Arg Gly Ile Gln Arg Asn Tyr Gln His Leu Trp Arg Trp

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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr 35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ser Tyr Lys Thr Glu Ala 50 55 60

His Asn Ile Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Glu Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Val Lys Arg Asn Asn Thr Ser Asn Asp Thr Asn Glu 130 135 140

Gly Glu Met Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp 145 150 155 160

Lys Lys Lys Gln Val His Ala Leu Phe Tyr Lys Leu Asp Val Val Pro 165 170 175 Ile Asp Asp Asn Asn Ser Asn Thr Ser Tyr Arg Leu Ile Asn Cys Asn 180 185 Thr Ser Ala Ile Thr Gln Ala Cys Pro Lys Val Thr Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Lys 215 Asp Lys Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val 235 Gln Cys Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Ile Ile Ile Val Gln Leu Asn Glu Ser Val Thr Ile Asn Cys Thr Arg Pro Tyr Asn Asn Thr Arg Gln Arg Thr Pro Ile 295 Gly Pro Gly Gln Ala Leu Tyr Thr Thr Arg Ile Lys Gly Asp Ile Arg 315 305 310 Gln Ala His Cys Asn Ile Ser Arg Ala Glu Trp Asn Lys Thr Leu Gln 325 330 Gln Val Ala Lys Lys Leu Gly Asp Leu Leu Asn Lys Thr Thr Ile Ile 345 Phe Lys Pro Ser Ser Gly Gly Asp Pro Glu Ile Thr Thr His Ser Phe Asn Cys Gly Glu Phe Phe Tyr Cys Asn Thr Ser Arg Leu Phe Asn 375 Ser Thr Trp Asn Asn Thr Lys Trp Asn Ser Thr Gly Lys Ile Thr Leu 385 Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Gly Val Gly Lys Ala Met Tyr Ala Pro Pro Ile Glu Gly Leu Ile Lys Cys Ser Ser Asn 425 430 420 Ile Thr Gly Leu Leu Thr Arg Asp Gly Gly Ala Asn Asn Ser His 435 Asn Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg 455 Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val 470 465

Ala	Pro	Thr	Arg	Ala 485	Lys	Arg	Arg	Val	Val 490	Glu	Arg	Glu	Lys	Arg 495	Ala
Ile	Gly	Leu	Gly 500	Ala	Met	Phe	Leu	Gly 505	Phe	Leu	Gly	Ala	Ala 510	Gly	Ser
Thr	Met	Gly 515	Ala	Ala	Ser	Met	Thr 520	Leu	Thr	Val	Gln	Ala 525	Arg	Gln	Leu
Leu	Ser 530	Gly	Ile	Val	Gln	Gln 535	Gln	Asn	Asn	Leu	Leu 540	Arg	Ala	Ile	Glu
Ala 545	Gln	Gln	His	Leu	Leu 550	Gln	Leu	Thr	Val	Trp 555	Gly	Ile	Lys	Gln	Leu 560
Gln	Ala	Arg	Ile	Leu 565	Ala	Val	Glu	Arg	Tyr 5,70	Leu	Lys	Asp	Gln	Gln 575	Leu
Leu	Gly	Ile	Trp 580	Gly	Cys	Ser	Gly	Lys 585	His	Ile	Cys	Thr	Thr 590	Thr	Val
Pro	Trp	Asn 595	Ser	Ser	Trp	Ser	Asn 600	Lys	Ser	Leu	Asp	Glu 605	Ile	Trp	Asn
Asn	Met 610	Thr	Trp	Met	Glu	Trp 615	Glu	Arg	Glu	Ile	Asp 620	Asn	Tyr	Thr	Gly
Leu 625	Ile	Tyr	Ser	Leu	Ile 630	Glu	Glu	Ser	Gln	Asn 635	Gln	Gln	Glu	Lys	Asn 640
Glu	Gln	Glu	Leu	Leu 645	Glu	Leu	Asp	Lys	Trp 650	Ala	Ser	Leu	Trp	Asn 655	Trp
Phe	Ser	Ile	Thr 660	Gln	Trp	Leu	Trp	Tyr 665	Ile	Lys	Ile	Phe	Ile 670	Met	Ile
Val	Gly	Gly 675	Leu	Ile	Gly	Leu	Arg 680	Ile	Val	Phe	Ala	Val 685	Leu	Ser	Leu
Val	Asn 690	Arg	Val	Arg	Gln	Gly 695	Tyr	Ser	Pro	Leu	Ser 700	Phe	Gln	Thr	Leu
Leu 705	Pro	Ala	Pro	Arg	Gly 710	Pro	Asp	Arg	Pro	Glu 715	Gly	Ile	Glu	Glu	Glu 720
Gly	Gly	Glu	Gln	Gly 725	Arg	Gly	Arg	Ser	Ile 730	Arg	Leu	Val	Asn	Gly 735	Phe
Ser	Ala	Leu	Ile 740	Trp	Asp	Asp	Leu	Arg 745	Asn	Leu	Cys	Leu	Phe 750	Ser	Tyr
His	Arg	Leu 755	Arg	Asp	Leu	Ile	Leu 760	Ile	Ala	Ala	Arg	Ile 765	Val	Glu	Leu
Leu	Gly 770	Arg	Arg	Gly	Trp	Glu 775	Ala	Leu	Lys	Tyr	Leu 780	Trp	Asn	Leu	Leu

Gln Tyr Trp Ile Gln Glu Leu Lys Asn Ser Ala Ile Ser Leu Phe Asp 785 790 795 800

Thr Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Val Ile Glu Ile 805 810 815

Val Gln Arg Ala Cys Arg Ala Ile Leu Asn Ile Pro Thr Arg Ile Arg 820 825 830

Gln Gly Leu Glu Arg Ala Leu Leu 835 840

<210> 83 <211> 2508 <212> DNA <213> Human immunodeficiency virus

<400> 83

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<210> 84 <211> 2523 <212> DNA <213> Human immunodeficiency virus

<400> 84

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<210> 85
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<211> 832

<212> PRT

<213> Human immunodeficiency virus

<400> 85

Met Arg Val Arg Gly Met Gln Arg Asn Trp Gln His Leu Gly Lys Trp

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Gly Leu Leu Phe Leu Gly Ile Leu Ile Ile Cys Asn Ala Ala Glu Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ser Tyr Glu Lys Glu Val
50 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Val Val Leu Glu Asn Val Thr Glu Asn Phe Asp Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Val Asn Ala Thr Asn Asn Asp Thr Asn Asp Asn Lys 130 135 140

Thr Gly Ala Ile Gln Asn Cys Ser Phe Asn Met Thr Thr Glu Val Arg 145 150 155 160

Asp Lys Lys Leu Lys Val His Ala Leu Phe Tyr Lys Leu Asp Ile Val 165 170 175

Pro Ile Ser Asn Asn Asn Ser Lys Tyr Arg Leu Ile Asn Cys Asn Thr 180 185 190

Ser Thr Ile Thr Gln Ala Cys Pro Lys Val Ser Trp Asp Pro Ile Pro 195 200 205

Ile His Tyr Cys Ala Pro Ala Gly Tyr Ala Ile Leu Lys Cys Asn Asp 210 215 220

Lys Arg Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln 225 230 235 240

Cys Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn 245 250 255

Gly Ser Leu Ala Glu Glu Asp Ile Ile Ile Arg Ser Gln Asn Ile Ser 260 265 270

Asp	Asn	Ala 275	Lys	Thr	Ile	Ile	Val 280	His	Leu	Asn	Glu	Ser 285	Val	Gln	Ile
Asn	Cys 290	Thr	Arg	Pro	Asn	Asn 295	Asn	Thr	Arg	Lys	Ser 300	Ile	His	Leu	Gly
Pro 305	Gly	Gln	Ala	Phe	Tyr 310	Ala	Thr	Gly	Glu	Ile 315	Ile	Gly	Asp	Ile	Arg 320
Lys	Ala	His	Cys	Asn 325	Ile	Ser	Gly	Thr	Gln 330	Trp	Asn	Lys	Thr	Leu 335	Glu
Gln	Val	Lys	Ala 340	Lys	Leu	Lys	Ser	His 345	Phe	Pro	Asn	Lys	Thr 350	Ile	Lys
Phe	Asn	Ser 355	Ser	Ser	Gly	Gly	Asp 360	Leu	Glu	Ile	Thr	Met 365	His	Ser	Phe
Asn	Cys 370	Arg	Gly	Glu	Phe	Phe 375	Tyr	Cys	Asn	Thr	Ser 380	Gly	Leu	Phe	Asn
Asp 385	Thr	Gly	Ser	Asn	Gly 390	Thr	Ile	Thr	Leu	Pro 395	Cys	Arg	Ile	Lys	Gln 400
Ile	Val	Asn	Met	Trp 405	Gln	Glu	Val	Gly	Arg 410	Ala	Met	Tyr	Ala	Ala 415	Pro
Ile	Ala	Gly	Asn 420	Ile	Thr	Cys	Asn	Ser 425	Asn	Ile	Thr	Gly	Leu 430	Leu	Leu
Thr	Arg	Asp 435	Gly	Gly	Gln	Asn	Asn 440	Thr	Glu	Thr	Phe	Arg 445	Pro	Gly	Gly
Gly	Asn 450	Met	Lys	Asp	Asn	Trp 455	Arg	Ser	Glu	Leu	Tyr 460	Lys	Tyr	Lys	Val
Val 465	Glu	Ile	Glu	Pro	Leu 470	Gly	Val	Ala	Pro	Thr 475	Lys	Ala	Lys	Arg	Gln 480
Val	Val	Lys	Arg	Glu 485	Arg	Arg	Ala	Val	Gly 490	Ile	Gly	Ala	Val	Phe 495	Leu
Gly	Phe	Leu	Gly 500	Ala	Ala	Gly	Ser	Thr 505	Met	Gly	Ala	Ala	Ser 510	Ile	Thr
Leu	Thr	Val 515	Gln	Ala	Arg	Gln	Leu 520	Leu	Ser	Gly	Ile	Val 525	Gln	Gln	Gln
Asn	Asn 530	Leu	Leu	Arg	Ala	Ile 535	Glu	Ala	Gln	Gln	His 540	Leu	Leu	Gln	Leu
Thr 545	Val	Trp	Gly	Ile	Lys 550	Gln	Leu	Gln	Ala	Arg 555	Val	Leu	Ala	Val	Glu 560
Arg	Tyr	Leu	Lys	Asp 565	Gln	Gln	Leu	Leu	Gly 570	Leu	Trp	Gly	Cys	Ser 575	Gly

Lys Leu Ile Cys Thr Thr Asn Val Pro Trp Asn Ser Ser Trp Ser Asn 580 585 590

Lys Ser Gln Asp Glu Ile Trp Asn Asn Met Thr Trp Met Glu Trp Glu 595 600 605

Lys Glu Ile Ser Asn Tyr Ser Asn Ile Ile Tyr Arg Leu Ile Glu Glu 610 615 620

Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu Leu Leu Ala Leu Asp 625 630 635 640

Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Ser Asn Trp Leu Trp 645 650 655

Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg 660 665 670

Ile Val Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Lys Gly Tyr 675 680 685

Ser Pro Leu Ser Leu Gln Thr Leu Ile Pro Ser Pro Arg Glu Pro Asp 690 695 700

Arg Pro Glu Gly Ile Glu Glu Gly Gly Glu Gln Gly Lys Asp Arg
705 710 715 720

Ser Val Arg Leu Val Asn Gly Phe Leu Ala Leu Val Trp Asp Asp Leu 725 730 735

Arg Asn Leu Cys Leu Phe Ser Tyr Arg His Leu Arg Asp Phe Ile Leu 740 745 750

Ile Ala Arg Ile Val Asp Arg Gly Leu Arg Arg Gly Trp Glu Ala
755 760 765

Leu Lys Tyr Leu Gly Asn Leu Thr Gln Tyr Trp Ser Gln Glu Leu Lys
770 780

Asn Ser Ala Ile Ser Leu Leu Asn Thr Thr Ala Ile Val Val Ala Glu 785 790 795 800

Gly Thr Asp Arg Val Ile Glu Ala Leu Gln Arg Ala Gly Arg Ala Val 805 810 815

Leu Asn Ile Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu 820 825 830

<210> 86

<211> 831

<212> PRT

<213> Human immunodeficiency virus

<400> 86

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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Arg Glu Val 50 55 60

His Asn Val Trp Ala Thr Tyr Ala Cys Val Pro Thr Asp Pro Ser Pro 65 70 75 80

Gln Glu Leu Val Leu Gly Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Val Asn Val Thr Ile Asn Thr Thr Asn Val Thr Leu 130 135 140

Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Lys Asp 145 150 155 160

Lys Lys Lys Glu Tyr Ala Leu Phe Tyr Arg Leu Asp Val Val Pro 165 170 175

Ile Asn Asn Ser Ile Val Tyr Arg Leu Ile Ser Cys Asn Thr Ser Thr 180 185 190

Val Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His 195 200 205

Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys 210 215 220

Phe Asn Gly Thr Gly Leu Cys Arg Asn Val Ser Thr Val Gln Cys Thr 225 230 235 240

His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser

Leu Ala Glu Glu Asp Ile Ile Ile Arg Ser Glu Asn Ile Ser Asp Asn 260 265 270

Thr Lys Thr Ile Ile Val Gln Phe Asn Arg Ser Val Glu Ile Asn Cys 275 280 285

Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro Gly 290 295 300

Arg 305	Ala	Phe	Tyr	Ala	Thr 310	Gly	Asp	Ile	Ile	Gly 315	Asp	Ile	Arg	Lys	Ala 320
Tyr	Cys	Asn	Ile	Asn 325	Arg	Thr	Leu	Trp	Asn 330	Glu	Thr	Leu	Lys	Lys 335	Val
Ala	Glu	Glu	Phe 340	Lys	Asn	His	Phe	Asn 345	Ile	Thr	Val	Thr	Phe 350	Asn	Pro
Ser	Ser	Gly 355	Gly	Asp	Leu	Glu	Ile 360	Thr	Thr	His	Ser	Phe 365	Asn	Cys	Arg
Gly	Glu 370	Phe	Phe	Tyr	Cys	Asn 375	Thr	Ser	Asp	Leu	Phe 380	Asn	Asn	Thr	Glu
Val 385	Asn	Asn	Thr	Lys	Thr 390	Ile	Thr	Leu	Pro	Cys 395	Arg	Ile	Arg	Gln	Phe 400
Val	Asn	Met	Trp	Gln 405	Arg	Val	Gly	Arg	Ala 410	Met	Tyr	Ala	Pro	Pro 415	Ile
Ala	Gly	Gln	Ile 420	Gln	Cys	Asn	Ser	Asn 425	Ile	Thr	Gly	Leu	Leu 430	Leu	Thr
Arg	Asp	Gly 435	Gly	Lys	Asn	Gly	Ser 440	Glu	Thr	Leu	Arg	Pro 445	Gly	Gly	Gly
Asp	Met 450	Arg	Asp	Asn	Trp	Arg 455	Ser	Glu	Leu	Tyr	Lys 460	Tyr	Lys	Val	Val
Lys 465	Ile	Glu	Pro	Leu	Gly 470	Val	Ala	Pro	Thr	Lys 475	Ala	Lys	Arg	Gln	Val 480
Val	Gln	Arg	Glu	Lys 485	Arg	Ala	Val	Gly	Ile 490	Gly	Ala	Val	Leu	Leu 495	Gly
Phe	Leu	Gly	Ala 500	Ala	Gly	Ser	Thr	Met 505	Gly	Ala	Ala	Ser	Ile 510	Thr	Leu
Thr	Val	Gln 515	Ala	Arg	Gln	Leu	Leu 520	Ser	Gly	Ile	Val	Gln 525	Gln	Gln	Ser
Asn	Leu 530	Leu	Lys	Ala	Ile	Glu 535	Ala	Gln	Gln	His	Leu 540	Leu	Gln	Leu	Thr
Val 545	Trp	Gly	Ile	Lys	Gln 550	Leu	Gln	Ala	Arg	Ile 555	Leu	Ala	Val	Glu	Arg 560
Tyr	Leu	Lys	Asp	Gln 565	Gln	Leu	Leu	Gly	Ile 570	Trp	Gly	Cys	Ser	Gly 575	Lys
Leu	Ile	Cys	Thr 580	Thr	Asn	Val	Pro	Trp 585	Asn	Ser	Ser	Trp	Ser 590	Asn	Lys
Ser	Gln	Asp 595	Glu	Ile	Trp	Asp	Asn 600	Met	Thr	Trp	Met	Gln 605	Trp	Glu	Lys

Glu Ile Ser Asn Tyr Thr Asp Thr Ile Tyr Arg Leu Ile Glu Asp Ala Gln Asn Gln Glu Lys Asn Glu Gln Asp Leu Leu Ala Leu Asp Lys 625 630 635 640 Trp Asp Asn Leu Trp Ser Trp Phe Thr Ile Thr Asn Trp Leu Trp Tyr 650 645 Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile 665 Val Phe Ala Val Leu Ser Val Val Asn Arg Val Arg Gln Gly Tyr Ser 680 675 Pro Leu Ser Leu Gln Thr Leu Ile Pro Asn Pro Arg Gly Pro Glu Arg 695 Pro Gly Gly Ile Glu Glu Gly Gly Glu Gln Asp Arg Asp Arg Ser 710 715 720 Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr Arg His Leu Arg Asp Phe Ile Leu Ile 745 Ala Ala Arg Thr Val Asp Met Gly Leu Lys Arg Gly Trp Glu Ala Leu 755 760 Lys Tyr Leu Trp Asn Leu Pro Gln Tyr Trp Gly Gln Glu Leu Lys Asn 775 Ser Ala Ile Ser Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Glu Gly 790 795 Thr Asp Arg Ile Ile Glu Val Leu Gln Arg Ala Gly Arg Ala Val Leu 805 810 His Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu 820 825

<210> 87

<211> 2499

<212> DNA

<213> Human immunodeficiency virus

<400> 87

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<210> 88
<211> 2496
<212> DNA
<213> Human immunodeficiency virus
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<210> 89
<211> 842
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<212> PRT
<213> Human immunodeficiency virus
<400> 89
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Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Ser Thr Glu Arg
His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro
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                     70
Gln Glu Ile Thr Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
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Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp
            100
                                105
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Glu	Ser	Leu 115	Lys	Pro	Cys	Val	Lys 120	Leu	Thr	Pro	Leu	Cys 125	Val	Thr	Leu
Asn	Cys 130	Thr	Asp	Val	Asn	Val 135	Thr	Asn	Asn	Asn	Thr 140	Asn	Asn	Thr	Lys
Lys 145	Glu	Ile	Lys	Asn	Cys 150	Ser	Phe	Asn	Ile	Thr 155	Thr	Glu	Ile	Arg	Asp 160
Lys	Lys	Lys	Lys	Glu 165	Tyr	Ala	Leu	Phe	Tyr 170	Arg	Leu	Asp	Val	Val 175	Pro
Ile	Asn	Asp	Asn 180	Gly	Asn	Ser	Ser	Ile 185	Tyr	Arg	Leu	Ile	Asn 190	Cys	Asn
Val	Ser	Thr 195	Ile	Lys	Gln	Ala	Cys 200	Pro	Lys	Val	Thr	Phe 205	Asp	Pro	Ile
Pro	Ile 210	His	Tyr	Cys	Ala	Pro 215	Ala	Gly	Phe	Ala	Ile 220	Leu	Lys	Cys	Arg
Asp 225	Lys	Lys	Phe	Asn	Gly 230	Thr	Gly	Pro	Cys	Lys 235	Asn	Val	Ser	Thr	Val 240
Gln	Cys	Thr	His	Gly 245	Ile	Lys	Pro	Val	Val 250	Ser	Thr	Gln	Leu	Leu 255	Leu
Asn	Gly	Ser	Leu 260	Ala	Glu	Glu	Glu	Ile 265	Ile	Ile	Arg	Ser	Glu 270	Asn	Ile
Thr	Asp	Asn 275	Thr	Lys	Val	Ile	Ile 280	Val	Gln	Leu	Asn	Glu 285	Thr	Ile	Glu
Ile	Asn 290	Cys	Thr	Arg	Pro	Asn 295	Asn	Asn	Thr	Arg	Lys 300	Ser	Ile	Arg	Ile
Gly 305	Pro	Gly	Gln	Ala	Phe 310	Tyr	Ala	Thr	Gly	Asp 315	Ile	Ile	Gly	Asp	Ile 320
Arg	Gln	Ala	His	Cys 325	Asn	Val	Ser	Arg	Thr 330	Lys	Trp	Asn	Glu	Met 335	Leu
Gln	Lys	Val	Lys 340	Ala	Gln	Leu	Lys	Lys 345	Ile	Phe	Asn	Lys	Ser 350	Ile	Thr
Phe	Asn	Ser 355	Ser	Ser	Gly	Gly	Asp 360	Leu	Glu	Ile	Thr	Thr 365	His	Ser	Phe
Asn	Cys 370	Arg	Gly	Glu	Phe	Phe 375	Tyr	Cys	Asn	Thr	Ser 380	Gly	Leu	Phe	Asn
Asn 385	Ser	Leu	Leu	Asn	Ser 390	Thr	Asn	Ser	Thr	Ile 395	Thr	Leu	Pro	Cys	Lys 400
Ile	Lys	Gln	Ile	Val 405	Arg	Met	Trp	Gln	Arg 410	Val	Gly	Gln	Ala	Met 415	Tyr

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- Leu Leu Thr Arg Asp Gly Gly Asn Asn Thr Glu Thr Phe Arg 435 440 445
- Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys 450 455 460
- Tyr Lys Ile Val Lys Ile Lys Pro Leu Gly Val Ala Pro Thr Arg Ala 465 470 475 480
- Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Leu Gly Ala
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 490
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- Val Leu Cly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala
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- Ser Ile Thr Leu Thr Val Gln Val Arg Gln Leu Leu Ser Gly Ile Val 515 520 525
- Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu 530 540
- Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu 545 550 555 560
- Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly 565 570 575
- Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro Trp Asn Thr Ser 580 585 590
- Trp Ser Asn Lys Ser Tyr Asn Glu Ile Trp Asp Asn Met Thr Trp Ile
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- Glu Trp Glu Arg Glu Ile Ser Asn Tyr Thr Gln Gln Ile Tyr Ser Leu 610 620
- Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Asp Leu Leu 625 630 635 640
- Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile Thr Lys
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- Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile 660 665 670
- Gly Leu Arg Ile Val Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg 675 680 685
- Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr His His Gln Arg
 690 695 700
- Glu Pro Asp Arg Pro Glu Arg Ile Glu Glu Gly Gly Glu Gln Asp
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Lys Asp Arg Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp
725 730 735

Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp
740 745 750

Phe Ile Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly Arg Ser Ser 755 760 765

Leu Lys Gly Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr Leu Trp Asn 770 780

Leu Leu Leu Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala Ile Asn Leu 785 790 795 800

Leu Asp Thr Ile Ala Ile Ala Val Ala Asn Trp Thr Asp Arg Val Ile 805 810 815

Glu Val Ala Gln Arg Ala Cys Arg Ala Ile Leu Asn Ile Pro Arg Arg 820 825 830

Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu 835 840

<210> 90

<211> 839

<212> PRT

<213> Human immunodeficiency virus

<400> 90

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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Lys 50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Met Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Glu 85 90 95

Asn Asp Met Val Glu Gln Met His Thr Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asp Cys Ser Asn Val Asn Thr Thr Asn Ala Thr Asn Ser Arg Phe Asn 130 135 140

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	Asp	Lys	Gln	Gln 165		Val	His	Ala	Leu 170		Tyr	Arg	Leu	Asp 175	Val
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Ile	Pro 210	Ile	His	Tyr	Cys	Ala 215	Pro	Ala	Gly	Phe	Ala 220	Ile	Leu	Lys	Cys
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Ile	Ser	Asp 275	Asn	Thr	Lys	Asn	Ile 280	Ile	Val	Gln	Leu	Asn 285	Lys	Pro	Val
Glu	Ile 290	Thr	Cys	Thr	Arg	Pro 295	Asn	Asn	Asn	Thr	Arg 300	Lys	Ser	Ile	His
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Ile	Arg	Gln	Ala	His 325	Cys	Asn	Ile	Ser	Gly 330	Lys	Lys	Trp	Asn	Lys 335	Thr
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Ile	Ile	Phe 355	Lys	Pro	His	Ser	Gly 360	Gly	Asp	Met	Glu	Val 365	Thr	Thr	His
Ser	Phe 370	Asn	Cys	Arg	Gly	Glu 375	Phe	Phe	Tyr	Cys	Asn 380	Thr	Ser	Gly	Leu
385	Asn			_	390					395					400
	Leu		-	405					410					415	
-	Gln		420	_				425					430		
Ser	Asn	Ile 435	Thr	Gly	Leu	Ile	Leu 440	Thr	Phe	Asp	Glu	Gly 445	Asn	Asn	Thr

Val Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser 455 Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala 475 470 Pro Thr Glu Ala Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Met Gly Ala Phe Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr 505 Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu 520 515 Ser Gly Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Gln Ala 535 Gln Gln His Met Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln 555 Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro 585 Trp Asn Ser Ser Trp Ser Asn Lys Ser Leu Asp Glu Ile Trp Asp Asn 595 Met Thr Trp Met Glu Trp Asp Lys Gln Ile Asn Asn Tyr Thr Glu Glu 615 Ile Tyr Arg Leu Leu Glu Val Ser Gln Thr Gln Glu Lys Asn Glu 635 630 Gln Asp Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe 645 650 Ser Ile Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Ile 695 Pro Asn Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Gly 715 710 Gly Glu Gln Asp Arg Asp Arg Ser Val Arg Leu Val Asn Gly Phe Leu 725 730 Pro Leu Val Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr Arg

745

750

740

Leu Leu Arg Asp Leu Leu Leu Ile Val Val Arg Thr Val Glu Leu Leu
755 760 765

Gly Arg Gly Arg Glu Ala Leu Lys Tyr Leu Trp Asn Leu Leu Gln
770 780

Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala Ile Asn Leu Leu Asn Thr 785 790 795 800

Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Ile Val 805 810 815

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Gly Phe Glu Arg Thr Leu Leu 835

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<211> 2529

<212> DNA

<213> Human immunodeficiency virus

<400> 91

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<210> 93

<211> 854

<212> PRT

<213> Human immunodeficiency virus

-400× 93

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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Asp 35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala His Glu Thr Glu Val
50 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile His Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys
85 90 95

Asn Asn Met Val Glu Gln Met Gln Glu Asp Val Ile Ser Leu Trp Asp

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asn Ala Asn Leu Thr Asn Val Asn Asn Ile Thr Asn Val 130 135 140

Ser Asn Ile Ile Gly Asn Ile Thr Asn Glu Val Arg Asn Cys Ser Phe 145 150 155 160

Asn Met Thr Glu Leu Arg Asp Lys Gln Lys Val His Ala Leu 165 170 175

Phe Tyr Lys Leu Asp Ile Val Gln Ile Glu Asp Asn Asn Ser Tyr Arg 180 185 190

Leu Ile Asn Cys Asn Thr Ser Val Ile Lys Gln Ala Cys Pro Lys Ile 195 200 205

Ser Phe Asp Pro Ile Pro Ile His Tyr Cys Thr Pro Ala Gly Tyr Ala 210 215 220

Ile Leu Lys Cys Asn Asp Lys Asn Phe Asn Gly Thr Gly Pro Cys Lys 225 230 235 240

Asn Val Ser Ser Val Gln Cys Thr His Gly Ile Lys Pro Val Val Ser 245 Thr Gln Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Ile Ile Arg Ser Glu Asn Leu Thr Asn Asn Ala Lys Thr Ile Ile Val His Leu Asn Lys Ser Val Glu Ile Asn Cys Thr Arg Pro Ser Asn Asn Thr Arg 295 Thr Ser Ile Thr Ile Gly Pro Gly Gln Val Phe Tyr Arg Thr Gly Asp 315 Ile Ile Gly Asp Ile Arg Lys Ala Tyr Cys Glu Ile Asn Gly Thr Lys 330 Trp Asn Glu Val Leu Lys Gln Val Thr Glu Lys Leu Lys Glu His Phe 345 Asn Asn Lys Thr Ile Ile Phe Gln Pro Pro Ser Gly Gly Asp Leu Glu 360 355 Ile Thr Met His His Phe Asn Cys Arg Gly Glu Phe Phe Tyr Cys Asn 375 Thr Thr Lys Leu Phe Asn Asn Thr Cys Ile Gly Asn Glu Thr Met Glu 395 400 Gly Cys Asn Gly Thr Ile Ile Leu Pro Cys Lys Ile Lys Gln Ile Ile 410 Asn Met Trp Gln Gly Ala Gly Gln Ala Met Tyr Ala Pro Pro Ile Ser Gly Arg Ile Asn Cys Val Ser Asn Ile Thr Gly Ile Leu Leu Thr Arg 440 435 Asp Gly Gly Ala Asn Asn Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly 455 Asn Ile Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val 465 Gln Ile Glu Pro Leu Gly Ile Ala Pro Thr Arg Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Met Ile Phe Gly 505 Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu 515 Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Ser

535

530

540

Asn 545	Leu	Leu	Arg	Ala	Ile 550	Glu	Ala	Gln	Gln	His 555	Leu	Leu	Gln	Leu	Thr 560
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Tyr	Leu	Lys	Asp 580	Gln	Lys	Phe	Leu	Gly 585	Leu	Trp	Gly	Cys	Ser 590	Gly	Lys
Ile	Ile	Cys 595	Thr	Thr	Ala	Val	Pro 600	Trp	Asn	Ser	Thr	Trp 605	Ser	Asn	Arg
Ser	Phe 610	Glu	Glu	Ile	Trp	Asn 615	Asn	Met	Thr	Trp	Ile 620	Glu	Trp	Glu	Arg
Glu 625	Ile	Ser	Asn	Tyr	Thr 630	Asn	Gln	Ile	Tyr	Glu 635	Ile	Leu	Thr	Glu	Ser 640
Gln	Asn	Gln	Gln	Asp 645	Arg	Asn	Glu	Lys	Asp 650	Leu	Leu	Glu	Leu	Asp 655	Lys
Trp	Ala	Ser	Leu 660	Trp	Asn	Trp	Phe	Asp 665	Ile	Thr	Asn	Trp	Leu 670	Trp	Tyr
Ile	Lys	Ile 675	Phe	Ile	Met	Ile	Val 680	Gly	Gly	Leu	Ile	Gly 685	Leu	Arg	Ile
Ile	Phe 690	Ala	Val	Leu	Ser	Ile 695	Val	Asn	Arg	Val	Arg 700	Gln	Gly	Tyr	Ser
Pro 705	Leu	Ser	Phe	Gln	Thr 710	Pro	Thr	His	His	Gln 715	Arg	Glu	Pro	Asp	Arg 720
Pro	Glu	Arg	Ile	Glu 725	Glu	Gly	Gly	Gly	Glu 730	Gln	Gly	Arg	Asp	Arg 735	Ser
Val	Arg	Leu	Val 740	Ser	Gly	Phe	Leu	Ala 745	Leu	Ala	Trp	Asp	Asp 750	Leu	Arg
Ser	Leu	Cys 755	Leu	Phe	Ser	Tyr	His 760	Arg	Leu	Arg	Asp	Phe 765	Ile	Leu	Ile
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Ala	Ile	Ala	Val 820	Ala	Gly	Trp	Thr	Asp 825	Arg	Val	Ile	Glu	Val 830	Ala	Gln
Gly	Ala	Trp 835	Arg	Ala	Ile	Leu	His 840	Ile	Pro	Arg	Arg	Ile 845	Arg	Gln	Gly

Leu Glu Arg Ala Leu Leu 850

<210> 94

<211> 844

<212> PRT

<213> Human immunodeficiency virus

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Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Glu Thr 35 40 45

Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Thr Glu Val His
50 60

Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro Gln 65 70 75 80

Glu Ile His Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys Asn
85 90 95

Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln 100 105 110

Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asp 115 120 125

Cys His Asn Asn Ile Thr Asn Ser Asn Thr Thr Asn Asn Asn Ala Gly
130 135 140

Lys Gln Lys Val Tyr Ala Leu Phe Tyr Arg Leu Asp Val Val Gln Ile 165 170 175

Asn Lys Asn Asn Ser Gln Tyr Arg Leu Ile Asn Cys Asn Thr Ser Ala 180 185 190

Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His 195 200 205

Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Glu 210 215 220

Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys Thr 225 230 235 240

His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser

Leu Ala Glu Glu Glu Ile Val Ile Arg Ser Glu Asn Ile Thr Asn Asn 265 Ala Lys Thr Ile Ile Val Gln Leu Val Lys Pro Val Lys Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Val Arg Ile Gly Pro Gly 295 Gln Thr Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala 305 His Cys Asn Val Ser Arg Thr Lys Trp Asn Asn Thr Leu Gln Gln Val 330 Ala Thr Gln Leu Arg Lys Tyr Phe Asn Lys Thr Ile Ile Phe Ala Asn 345 Pro Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly 360 Gly Glu Phe Phe Tyr Cys Asn Thr Ser Glu Leu Phe Asn Ser Thr Trp 375 Asn Ser Thr Trp Asn Asn Thr Glu Lys Cys Ile Thr Leu Gln Cys Arg 385 Ile Lys Gln Ile Val Asn Met Trp Gln Lys Val Gly Gln Ala Met Tyr Ala Pro Pro Ile Gln Gly Val Ile Arg Cys Glu Ser Asn Ile Thr Gly 425 Leu Leu Leu Thr Arg Asp Gly Gly Asn Asn Ser Thr Asn Glu Thr Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala Pro Thr 480 465 470 Arg Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val Gly Leu Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly 515 Ile Val Gln Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln

His Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg

545 550 555 560

Val Leu Ala Leu Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile 565 570 575

Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Thr Val Pro Trp Asn 580 585 590

Ser Ser Trp Ser Asn Lys Thr Tyr Asn Asp Ile Trp Asp Asn Met Thr 595 600 605

Trp Leu Gln Trp Asp Lys Glu Ile Ser Asn Tyr Thr Asp Ile Ile Tyr 610 615 620

Asn Leu Ile Glu Glu Ser Gln Asn Gln Glu Lys Asn Glu Gln Asp 625 630 635 640

Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asp Ile 645 650 655

Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly 660 665 670

Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Thr Ile Ile Asn Arg 675 680 685

Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr His His 690 695 700

Gln Arg Glu Pro Asp Arg Pro Glu Arg Ile Glu Glu Gly Gly Glu 705 710 715 720

Gln Asp Arg Asp Arg Ser Val Arg Leu Val Ser Gly Phe Leu Ala Leu 725 730 735

Ala Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu 740 745 750

Arg Asp Phe Val Leu Ile Ala Ala Arg Thr Val Glu Leu Leu Gly His 755 760 765

Ser Ser Leu Lys Gly Leu Arg Leu Gly Trp Glu Ala Leu Lys Tyr Leu 770 775 780

Gly Asn Leu Leu Ser Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala Ile 785 790 795 800

Asn Leu Leu Asp Thr Ile Ala Ile Ala Val Ala Asn Trp Thr Asp Arg 805 810 815

Val Ile Glu Ile Gly Gln Arg Ala Gly Arg Ala Ile Leu Asn Ile Pro 820 825 830

Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu 835 840 <210> 95 <211> 2565 <212> DNA <213> Human immunodeficiency virus

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<212> DNA

<213> Human immunodeficiency virus

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- Trp Ala Thr Tyr Ala Cys Val Pro Thr Asp Pro Ser Pro Gln Glu Ile 65 70 75 80
- Pro Leu Glu Asn Val Thr Glu Asn Phe Asn Met Gly Lys Asn Asn Met 85 90 95
- Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp Gln Ser Leu 100 105 110
- Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu Asn Cys Thr 115 120 125
- Asp Leu Lys Lys Asn Val Thr Ser Thr Asn Thr Ser Ser Ile Lys Met 130 135 140
- Met Glu Met Lys Asn Cys Ser Phe Asn Ile Thr Thr Asp Leu Arg Asp 145 150 155 160
- Lys Val Lys Lys Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Val Val Gln
 165 170 175
- Ile Asp Asn Asp Ser Tyr Arg Leu Ile Ser Cys Asn Thr Ser Val Val 180 185 190
- Thr Gln Ala Cys Pro Lys Ile Ser Phe Glu Pro Ile Pro Ile His Tyr 195 200 205
- Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys Lys Phe 210 215 220
- Asn Gly Thr Gly Pro Cys Thr Asn Val Ser Thr Val Gln Cys Thr His 225 230 235 240
- Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu 245 250 255
- Ala Glu Glu Val Val Ile Arg Ser Val Asn Phe Thr Asp Asn Thr 260 265 270
- Lys Thr Ile Ile Val Gln Leu Lys Glu Pro Val Glu Ile Asn Cys Thr 275 280 285
- Arg Pro Asn Asn Asn Thr Arg Lys Gly Ile His Ile Gly Pro Gly Arg 290 295 300
- Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln Ala His 305 310 315
- Cys Asn Ile Ser Ile Thr Lys Trp Asn Asn Thr Leu Lys Gln Ile Val 325 330 335

- Ile Lys Leu Arg Lys Gln Phe Gly Asn Lys Thr Ile Val Phe Asn Gln 340 345 350
- Ser Ser Gly Gly Asp Pro Glu Ile Val Met His Ser Phe Asn Cys Gly 355 360 365
- Gly Glu Phe Phe Tyr Cys Asn Thr Thr Lys Leu Phe Asn Ser Thr Trp 370 375 380
- Asn Gly Thr Glu Glu Leu Asn Asn Thr Glu Gly Asp Ile Val Thr Leu 385 390 395 400
- Pro Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Glu Val Gly Lys 405 410 415
- Ala Met Tyr Ala Pro Pro Ile Ala Gly Gln Ile Arg Cys Ser Ser Asn 420 425 430
- Ile Thr Gly Leu Leu Thr Arg Asp Gly Gly Asn Gln Ser Asn Val 435 440 445
- Thr Glu Ile Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg 450 455 460
- Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val 465 470 475 480
- Ala Pro Thr Lys Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg Ala
 485 490 495
- Val Gly Ile Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser 500 505 510
- Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu
 515 520 525
- Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu 530 540
- Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu 545 550 555 560
- Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu 565 570 575
- Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Ala Val 580 585 590
- Pro Trp Asn Thr Ser Trp Ser Asn Lys Ser Leu Asp Glu Ile Trp Asn 595 600 605
- Asn Met Thr Trp Met Glu Trp Glu Arg Glu Ile Asn Asn Tyr Thr Gly 610 620
- Leu Ile Tyr Asn Leu Ile Glu Glu Ser Gln Asn Gln Glu Lys Asn 625 630 635 640

Glu Glu Glu Ile Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp 645 650 655

Phe Asp Ile Ser Lys Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile 660 665 670

Val Gly Gly Leu Val Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile 675 680 685

Val Asn Arg Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Arg 690 695 700

Leu Pro Thr Gln Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu 705 710 715 720

Gly Gly Glu Arg Asp Arg Asp Thr Ser Ile Arg Leu Val Asn Gly Phe
725 730 735

Leu Ala Leu Ile Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ile Tyr
740 745 750

His His Leu Arg Asp Leu Leu Leu Ile Ala Ala Arg Ile Val Glu Leu 755 760 765

Leu Gly Arg Arg Gly Trp Glu Ala Leu Lys Tyr Trp Trp Asn Leu Leu 770 780

Gln Tyr Trp Ile Gln Glu Leu Lys Ser Ser Ala Ile Asn Leu Ile Asp 785 790 795 800

Thr Ile Ala Ile Ala Val Ala Gly Trp Thr Asp Arg Val Ile Glu Ile 805 810 815

Gly Gln Arg Phe Cys Arg Ala Ile Arg Asn Ile Pro Arg Arg Ile Arg 820 825 830

Gln Gly Ala Glu Lys Ala Leu Gln 835 840

<210> 98

<211> 848

<212> PRT

<213> Human immunodeficiency virus

<400> 98

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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Arg Asp Ala Glu
35 40 45

Thr Thr Pro Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Lys Glu Val
50 55 60

His 65	Asn	Ile	Trp	Ala	Thr 70	His	Ala	Cys	Val	Pro 75	Thr	Asp	Pro	Asn	Pro 80
Gln	Glu	Ile	Ala	Leu 85	Lys	Asn	Val	Thr	Glu 90	Asn	Phe	Asn	Met	Trp 95	Lys
Asn	Asn	Met	Val 100	Glu	Gln	Met	His	Glu 105	Asp	Ile	Ile	Ser	Leu 110	Trp	Asp
Glu	Gly	Leu 115	Lys	Pro	Cys	Val	Lys 120	Leu	Thr	Pro	Leu	Cys 125	Val	Ala	Leu
Asn	Cys 130	Ser	Asn	Ala	Thr	Ile 135	Asn	Asn	Ser	Thr	Lys 140	Thr	Asn	Ser	Thr
Glu 145	Glu	Ile	Lys	Asn	Cys 150	Ser	Phe	Asn	Ile	Thr 155	Thr	Glu	Ile	Arg	Asp 160
Lys	Lys	Lys	Lys	Glu 165	Tyr	Ala	Leu	Phe	Tyr 170	Arg	Leu	Asp	Ile	Val 175	Pro
Ile	Asn	Asp	Ser 180	Ala	Asn	Asn	Asn	Ser 185	Ile	Asn	Ser	Glu	Tyr 190	Met	Leu
Ile	Asn	Cys 195	Asn	Ala	Ser	Thr	Ile 200	Lys	Gln	Ala	Cys	Pro 205	Lys	Val	Thr
Phe	Glu 210	Pro	Ile	Pro	Ile	His 215	Tyr	Cys	Ala	Pro	Ala 220	Gly	Phe	Ala	Ile
Leu 225	Lys	Cys	Asn	Asp	Lys 230	Asn	Phe	Thr	Gly	Leu 235	Gly	Pro	Cys	Thr	Asn 240
Val	Ser	Ser	Val	Gln 245	Cys	Thr	His	Gly	Ile 250	Lys	Pro	Val	Val	Ser 255	Thr
Gln	Leu	Leu	Leu 260	Asn	Gly	Ser	Leu	Ala 265	Thr	Glu	Gly	Val	Val 270	Ile	Arg
Ser	Lys	Asn 275	Phe	Thr	Asp	Asn	Thr 280	Lys	Asn	Ile	Ile	Val 285	Gln	Leu	Ala
Lys	Ala 290	Val	Lys	Ile	Asn	Cys 295	Thr	Arg	Pro	Asn	Asn 300	Asn	Thr	Arg	Lys
Ser 305	Val	His	Ile	Gly	Pro 310	Gly	Gln	Thr	Trp	Tyr 315	Ala	Thr	Gly	Glu	Ile 320
Ile	Gly	Asp	Ile	Arg 325	Gln	Ala	His	Cys	Asn 330	Ile	Ser	Gly	Asn	Asp 335	Trp
Asn	Glu	Thr	Leu 340	Gln	Lys	Ile	Val	Glu 345	Glu	Leu	Arg	Lys	His 350	Phe	Pro
Asn	Lys	Thr 355	Ile	Ile	Phe	Ala	Pro 360	Ser	Ala	Gly	Gly	Asp 365	Leu	Glu	Ile

Thr	Thr 370	His	Ser	Phe	Asn	Cys 375	Gly	Gly	Glu	Phe	Phe 380	Tyr	Cys	Asn	Thr
Ser 385	Glu	Leu	Phe	Asn	Ser 390	Thr	Tyr	Met	Asn	Ser 395	Thr	Asn	Ser	Thr	Thr 400
Ile	Asn	Lys	Thr	Ile 405	Thr	Leu	Pro	Cys	Arg 410	Ile	Lys	Gln	Ile	Val 415	Ser
Met	Trp	Gln	Glu 420	Val	Gly	Gln	Ala	Met 425	Tyr	Ala	Pro	Pro	Ile 430	Ala	Gly
Ser	Ile	Asn 435	Cys	Ser	Ser	Asp	Ile 440	Thr	Gly	Ile	Ile	Leu 445	Thr	Arg	Asp
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Asp 465	Met	Arg	Asp	Asn	Trp 470	Arg	Ser	Glu	Leu	Tyr 475	Lys	Tyr	Lys	Val	Val 480
Lys	Ile	Glu	Pro	Val 485	Gly	Val	Ala	Pro	Thr 490	Arg	Ala	Arg	Arg	Arg 495	Val
Val	Gln	Arg	Glu 500	Lys	Arg	Ala	Val	Gly 505	Ile	Gly	Ala	Val	Phe 510	Leu	Gly
Phe	Leu	Gly 515	Ala	Ala	Gly	Ser	Thr 520	Met	Gly	Ala	Ala	Ser 525	Ile	Thr	Leu
Thr	Val 530	Gln	Ala	Arg	Gln	Leu 535	Leu	Ser	Gly	Ile	Val 540	Gln	Gln	Gln	Ser
Asn 545	Leu	Leu	Arg	Ala	Ile 550	Glu	Ala	Gln	Gln	His 555	Leu	Leu	Arg	Leu	Thr 560
Val	Trp	Gly	Ile	Lys 565	Gln	Leu	Gln	Ala	Arg 570	Val	Leu	Ala	Leu	Glu 575	Ser
Tyr	Leu	Lys	Asp 580	Gln	Gln	Leu	Leu	Gly 585	Ile	Trp	Gly	Cys	Ser 590	Gly	Lys
Leu	Ile	Cys 595	Thr	Thr	Asn	Val	Pro 600	Trp	Asn	Ser	Ser	Trp 605	Ser	Asn	Lys
Ser	Tyr 610	Asn	Asp	Ile	Trp	Asp 615	Asn	Met	Thr	Trp	Leu 620	Gln	Trp	Asp	Lys
Glu 625	Ile	Asn	Asn	Tyr	Thr 630	Gln	Ile	Ile	Tyr	Glu 635	Leu	Leu	Glu	Glu	Ser 640
Gln	Asn	Gln	Gln	Glu 645	Lys	Asn	Glu	Gln	Asp 650	Leu	Leu	Ala	Leu	Asp 655	Lys
Trp	Ala	Asn	Leu 660	Trp	Asn	Trp	Phe	Asn 665	Ile	Ser	Asn	Trp	Leu 670	Trp	Tyr

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Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg Ile
675 680 685
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Ile Phe Ala Val Leu Ser Ile Val Asn Arg Val Arg Gln Gly Tyr Ser 690 695 700

Pro Leu Ser Leu Gln Thr Leu Ile Pro Thr Thr Gln Arg Gly Pro Asp 705 710 715 720

Arg Pro Glu Gly Thr Glu Glu Glu Gly Glu Gln Asp Arg Ser Arg
725 730 735

Ser Ile Arg Leu Val Asn Gly Phe Leu Pro Leu Ile Trp Asp Asp Leu 740 745 750

Arg Asn Leu Cys Leu Phe Ser Tyr Arg His Leu Arg Asn Leu Leu Leu 755 760 765

Ile Val Ala Arg Thr Val Glu Leu Leu Gly Ile Arg Gly Trp Glu Ala 770 780

Leu Lys Tyr Leu Trp Asn Leu Leu Leu Tyr Trp Gly Gln Glu Leu Arg
785 790 795 800

Asn Ser Ala Ile Asn Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Glu 805 810 815

Gly Thr Asp Arg Ile Ile Glu Ala Val Gln Arg Ala Cys Arg Ala Ile 820 825 830

Arg Asn Ile Pro Arg Arg Ile Arg Gln Gly Leu Glu Arg Ala Leu Leu 835 840 845

<210> 99

<211> 2523

<212> DNA

<213> Human immunodeficiency virus

<400> 99

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<210> 100
<211> 2547
<212> DNA
<213> Human immunodeficiency virus
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<210> 101
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<211> 832

<212> PRT

<213> Human immunodeficiency virus

<400> 101

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Met Trp Val Thr Val Tyr Tyr Gly Val Pro Ala Trp Glu Asp Ala Asp 35 40 45

Thr Ile Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Ser Ala Glu Lys 50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Ala Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn His Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Glu Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asn Val Thr Lys Asn Asn Asn Thr Lys Ile Met Gly Arg 130 135 140

Glu 145	Glu	Ile	Lys	Asn	Cys 150	Ser	Phe	Asn	Val	Thr 155	Thr	Glu	Ile	Arg	Asp 160
Lys	Lys	Lys	Lys	Glu 165	Tyr	Ala	Leu	Phe	Tyr 170	Arg	Leu	Asp	Val	Val 175	Pro
Ile	Asp	Asp	Asn 180	Asn	Asn	Ser	Tyr	Arg 185	Leu	Ile	Asn	Cys	Asn 190	Ala	Ser
Thr	Ile	Lys 195	Gln	Ala	Cys	Pro	Lys 200	Val	Ser	Phe	Glu	Pro 205	Ile	Pro	Ile
His	Tyr 210	Cys	Ala	Pro	Ala	Gly 215	Phe	Ala	Ile	Leu	Lys 220	Cys	Arg	Asp	Lys
Asn 225	Phe	Asn	Gly	Thr	Gly 230	Pro	Cys	Lys	Asn	Val 235	Ser	Thr	Val	Gln	Cys 240
Thr	His	Gly	Ile	Lys 245	Pro	Val	Val	Ser	Thr 250	Gln	Leu	Leu	Leu	Asn 255	Gly
Ser	Leu	Ala	Glu 260	Glu	Glu	Ile	Ile	Ile 265	Lys	Ser	Glu	Asn	Leu 270	Thr	Asp
Asn	Thr	Lys 275	Thr	Ile	Ile	Val	Gln 280	Leu	Asn	Lys	Ser	Val 285	Glu	Ile	Arg
Cys	Thr 290	Arg	Pro	Asn	Asn	Asn 295	Thr	Arg	Lys	Ser	Ile 300	Ser	Phe	Gly	Pro
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Ala	His	Cys	Asn	Val 325	Ser	Arg	Thr	Asp	Trp 330	Asn	Asn	Met	Leu	Gln 335	Asn
Val	Thr	Ala	Lys 340	Leu	Lys	Glu	Leu	Phe 345	Asn	Lys	Asn	Ile	Thr 350	Phe	Asn
Ser	Ser	Ala 355	Gly	Gly	Asp	Leu	Glu 360	Ile	Thr	Thr	His	Ser 365	Phe	Asn	Cys
Gly	Gly 370	Glu	Phe	Phe	Tyr	Cys 375	Asn	Thr	Ser	Gln	Leu 380	Phe	Asn	Ser	Thr
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Ile	Val	Arg	Met	Trp 405	Gln	Arg	Val	Gly	Gln 410	Ala	Met	Tyr	Ala	Pro 415	Pro
Ile	Ala	Gly	Asn 420	Ile	Thr	Cys	Thr	Ser 425	Asn	Ile	Thr	Gly	Leu 430	Leu	Leu
Thr	Arg	Asp 435	Gly	Asn	Asn	Asn	Asp 440	Ser	Glu	Thr	Phe	Arg 445	Pro	Gly	Gly

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Val 465	Lys	Ile	Lys	Pro	Leu 470	Gly	Ile	Ala	Pro	Thr 475	Arg	Ala	Arg	Arg	Arg 480
Val	Val	Gly	Arg	Glu 485	Lys	Arg	Ala	Val	Gly 490	Leu	Gly	Ala	Val	Phe 495	Leu
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Ser	Asn 530	Leu	Leu	Arg	Ala	Ile 535	Glu	Ala	Gln	Gln	His 540	Leu	Leu	Gln	Leu
Thr 545	Val	Trp	Gly	Ile	Lys 550	Gln	Leu	Gln	Ala	Arg 555	Val	Leu	Ala	Val	Glu 560
Arg	Tyr	Leu	Lys	Asp 565	Gln	Gln	Leu	Leu	Gly 570	Ile	Trp	Gly	Cys	Ser 575	Gly
Lys	Leu	Ile	Cys 580	Pro	Thr	Asn	Val	Pro 585	Trp	Asn	Ala	Ser	Trp 590	Ser	Asn
Lys	Thr	Tyr 595	Asn	Glu	Ile	Trp	Asp 600	Asn	Met	Thr	Trp	Ile 605	Glu	Trp	Asp
Arg	Glu 610	Ile	Asn	Asn	Tyr	Thr 615	Gln	Gln	Ile	Tyr	Ser 620	Leu	Ile	Glu	Glu
Ser 625	Gln	Asn	Gln	Gln	Glu 630	Lys	Asn	Glu	Gln	Asp 635	Leu	Leu	Ala	Leu	Asp 640
Lys	Trp	Ala	Ser	Leu 645	Trp	Ser	Trp	Phe	Asp 650	Ile	Ser	Asn	Trp	Leu 655	Trp
Tyr	Ile	Lys	Ile 660	Phe	Ile	Met	Ile	Val 665	Gly	Gly	Leu	Ile	Gly 670	Leu	Arg
Ile	Val	Phe 675	Ala	Val	Leu	Ser	Ile 680	Val	Asn	Arg	Val	Arg 685	Gln	Gly	Tyr
Ser	Pro 690	Leu	Ser	Leu	Gln	Thr 695	Leu	Ile	Pro	Asn	Pro 700	Thr	Gly	Ala	Asp
Arg 705	Pro	Gly	Glu	Ile	Glu 710	Glu	Gly	Gly	Gly	Glu 715	Gln	Gly	Arg	Thr	Arg 720
Ser	Ile	Arg	Leu	Val 725	Asn	Gly	Phe	Leu	Ala 730	Leu	Ala	Trp	Asp	Asp 735	Leu
Arg	Ser	Leu	Cys 740	Leu	Phe	Ser	Tyr	His 745	Arg	Leu	Arg	Asp	Phe 750	Val	Leu

Ile Ala Ala Arg Thr Val Glu Thr Leu Gly His Arg Gly Trp Glu Ile
755 760 765

Leu Lys Tyr Leu Gly Asn Leu Val Cys Tyr Trp Gly Gln Glu Leu Lys 770 775 780

Asn Ser Ala Ile Ser Leu Leu Asp Thr Thr Ala Ile Ala Val Ala Asn 785 790 795 800

Trp Thr Asp Arg Val Ile Glu Val Val Gln Arg Val Phe Arg Ala Phe 805 810 815

Leu Asn Ile Pro Arg Arg Ile Arg Gln Gly Phe Glu Arg Ala Leu Leu 820 825 830

<210> 102

<211> 858

<212> PRT

<213> Human immunodeficiency virus

<400> 102

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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Lys

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Glu Thr Glu Val 50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Val Met Glu Asn Val Thr Glu Asn Phe Asn Met Trp Asn 85 90 95

Asn Asp Met Val Asn Gln Met His Glu Asp Val Ile Ser Leu Trp Asp 100 105 110

Gln Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Glu Cys Thr Asn Val Ser Ser Asn Gly Asn Gly Thr Tyr Asn Glu Thr 130 135 140

Tyr Asn Glu Ser Val Lys Glu Ile Lys Asn Cys Ser Phe Asn Ala Thr 145 150 155 160

Thr Leu Leu Arg Asp Arg Lys Lys Thr Val Tyr Ala Leu Phe Tyr Arg 165 170 175

Leu Asp Ile	Val Pro 180	Leu Asn	Asp	Glu 185	Asn	Ser	Gly	Lys	Asn 190	Ser	Ser
Glu Tyr Tyr 195		Ile Asn	Cys 200	Asn	Thr	Ser	Ala	Ile 205	Thr	Gln	Ala
Cys Pro Lys 210	Val Thr	Phe Asp 215		Ile	Pro	Ile	His 220	Tyr	Cys	Thr	Pro
Ala Gly Tyr 225	Ala Ile	Leu Lys 230	Cys	Asn	Asp	Lys 235	Lys	Phe	Asn	Gly	Thr 240
Gly Gln Cys	His Asn 245	Val Ser	Thr	Val	Gln 250	Cys	Thr	His	Gly	Ile 255	Lys
Pro Val Val	Ser Thr 260	Gln Leu	Leu	Leu 265	Asn	Gly	Ser	Leu	Ala 270	Glu	Arg
Glu Ile Ile 275	_	Ser Glu	Asn 280	Leu	Thr	Asn	Asn	Val 285	Lys	Thr	Ile
Ile Val His 290	Leu Asn	Gln Ser 295		Glu	Ile	Val	Cys 300	Thr	Arg	Pro	Asn
Asn Asn Thr 305	Arg Lys	Ser Ile	Arg	Ile	Gly	Pro 315	Gly	Gln	Thr	Phe	Tyr 320
Ala Thr Gly	Asp Ile 325		Asp	Ile	Arg 330	Gln	Ala	His	Cys	Asn 335	Ile
Ser Lys Asp	Lys Trp 340	Tyr Glu	Thr	Leu 345	Gln	Arg	Val	Ser	Lys 350	Lys	Leu
Ala Glu His		Asn Lys	360	Ile	Lys	Phe	Ala	Ser 365	Ser	Ser	Gly
Gly Asp Leu 370	Glu Ile	Thr Thr		Ser	Phe	Asn	Cys 380	Arg	Gly	Glu	Phe
Phe Tyr Cys 385	Asn Thr	Ser Gly 390	Leu	Phe	Asn	Gly 395	Thr	Tyr	Met	Asn	Gly 400
Thr Asn Asn	Ser Ser 405		lle	Thr	Ile 410	Pro	Cys	Arg	Ile	Lys 415	Gln
Ile Ile Asn	Met Trp 420	Gln Glu	. Val	Gly 425	Arg	Ala	Met	Tyr	Ala 430	Pro	Pro
Ile Glu Gly 435		Thr Cys	Lys 440	Ser	Asn	Ile	Thr	Gly 445	Leu	Leu	Leu
Val Arg Asp 450	Gly Gly	Arg Thr 455		Ser	Asn	Asn	Thr 460	Glu	Ile	Phe	Arg
Pro Gly Gly 465	Gly Asp	Met Arg	Asn	Asn	Trp	Arg 475	Asn	Glu	Leu	Tyr	Lys 480

Tyr l	Lys	Val	Val	Glu 485	Ile	Lys	Pro	Leu	Gly 490	Val	Ala	Pro	Thr	Ala 495	Ala
Lys A	Arg	Arg	Val 500	Val	Glu	Arg	Glu	Lys 505	Arg	Ala	Val	Gly	Leu 510	Gly	Ala
Val 1	Phe	Leu 515	Gly	Phe	Leu	Gly	Ala 520	Ala	Gly	Ser	Thr	Met 525	Gly	Ala	Ala
Ser :	Ile 530	Thr	Leu	Thr	Val	Gln 535	Ala	Arg	Gln	Leu	Leu 540	Ser	Gly	Ile	Val
Gln (Gln	Gln	Ser	Asn	Leu 550	Leu	Arg	Ala	Ile	Glu 555	Ala	Gln	Gln	His	Met 560
Leu (Gln	Leu	Thr	Val 565	Trp	Gly	Ile	Lys	Gln 570	Leu	Gln	Thr	Arg	Val 575	Leu
Ala :	Ile	Glu	Arg 580	Tyr	Leu	Lys	Asp	Gln 585	Gln	Leu	Leu	Gly	Ile 590	Trp	Gly
Cys :	Ser	Gly 595	Lys	Leu	Ile	Cys	Thr 600	Thr	Ala	Val	Pro	Trp 605	Asn	Ser	Ser
Trp (Ser 610	Asn	Lys	Ser	Gln	Gln 615	Glu	Ile	Trp	Asp	Asn 620	Met	Thr	Trp	Met
Gln 7	Trp	Asp	Lys	Glu	Ile 630	Ser	Asn	Tyr	Thr	Asn 635	Thr	Ile	Tyr	Arg	Leu 640
Leu (Glu	Asp	Ser	Gln 645	Asn	Gln	Gln	Glu	Arg 650	Asn	Glu	Lys	Asp	Leu 655	Leu
Ala 1	Leu	Asp	Ser 660	Trp	Lys	Asn	Leu	Trp 665	Ser	Trp	Phe	Asp	Ile 670	Thr	Asn
Trp 1	Leu	Trp 675	Tyr	Ile	Lys	Ile	Phe 680	Ile	Met	Ile	Val	Gly 685	Gly	Leu	Ile
Gly 1	Leu 690	Arg	Ile	Ile	Phe	Ala 695	Val	Leu	Ser	Ile	Val 700	Asn	Arg	Val	Arg
Gln (Gly	Tyr	Ser	Pro	Leu 710	Ser	Phe	Gln	Ile	Leu 715	Thr	Pro	Asn	Pro	Gly 720
Gly 1	Pro	Gly	Arg	Leu 725	Gly	Arg	Ile	Glu	Glu 730	Glu	Gly	Gly	Glu	Gln 735	Asp
Lys :	Thr	Arg	Ser 740	Ile	Arg	Leu	Val	Asn 745	Gly	Phe	Leu	Ala	Leu 750	Ala	Trp
Asp i	Asp	Leu 755	Arg	Asn	Leu	Cys	Leu 760	Phe	Ser	Tyr	His	Arg 765	Leu	Arg	Asp′
Phe :	Ile 770	Leu	Leu	Thr	Ala	Arg 775	Gly	Val	Glu	Leu	Leu 780	Gly	Arg	Asn	Ser

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Leu Arg Gly Leu Gln Arg Gly Trp Glu Ala Leu Lys Tyr Leu Gly Ser 785 790 795 800

Leu Val Gln Tyr Trp Gly Leu Glu Leu Lys Lys Ser Thr Ile Ser Leu
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810

815

Val Asp Thr Ile Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile 820 825 830

Asn Ile Val Gln Gly Ile Cys Arg Ala Ile His Asn Ile Pro Arg Arg 835 840 845

Ile Arg Gln Gly Phe Glu Ala Ala Leu Gln 850 855

805

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<210> 103
<211> 2499
<212> DNA
<213> Human immunodeficiency virus
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<400> 103

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gtgcccgcct gggaggacgc cgacaccatc ctgttctgcg cctccgacgc caaggcctac 180
tccgccgaga agcacaacgt gtgggccacc cacgcctgcg tgcccaccga ccccaacccc 240
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<210> 104 <211> 2577 <212> DNA <213> Human immunodeficiency virus

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<210> 105

<211> 837

<212> PRT

<213> Human immunodeficiency virus

<400> 105

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Gly Ile Leu Gly Phe Trp Met Leu Met Ile Cys Asn Ala Thr Gly Asn 20 25 30

Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Thr Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Lys Ala Glu Ala 50 55 60

His Asn Ile Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Val Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Gly Met Val Asp Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Gln Gly Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Ser Asp Val Asn Ala Thr Asn Ser Ala Thr Asn Thr Val Val 130 135 140

Ala Gly Met Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Arg Asp 145 150 155 160

Lys Lys Lys Gln Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Val Val Gln 165 170 175

Ile Asp Gly Ser Asn Thr Ser Tyr Arg Leu Ile Asn Cys Asn Thr Ser 180 185 190

Ala Ile Thr Gln Ala Cys Pro Lys Val Thr Phe Glu Pro Ile 195 200 205

His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys 210 215 220

Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys 225 230 235 240

Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly 245 250 255

- Ser Leu Ala Glu Glu Ile Ile Ile Arg Ser Glu Asn Leu Thr Asp 260 265 270
- Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Glu Ser Val Thr Ile Asn 275 280 285
- Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile Arg Ile Gly Pro 290 295 300
- Gly Gln Thr Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asn Ile Arg Gln 305 310 315 320
- Ala Tyr Cys Asn Ile Ser Gly Thr Glu Trp Asn Lys Thr Leu Gln Gln 325 330 335
- Val Ala Lys Lys Leu Gly Asp Leu Leu Asn Lys Thr Thr Ile Ile Phe 340 345 350
- Lys Pro Ser Ser Gly Gly Asp Pro Glu Ile Thr Thr His Thr Phe Asn 355 360 365
- Cys Gly Glu Phe Phe Tyr Cys Asn Thr Ser Lys Leu Phe Asn Ser 370 380
- Ser Trp Thr Ser Asn Asn Thr Gly Asn Thr Ser Thr Ile Thr Leu Pro 385 390 395 400
- Cys Arg Ile Lys Gln Ile Ile Asn Met Trp Gln Gly Val Gly Lys Ala
- Ile Tyr Ala Pro Pro Ile Ala Gly Leu Ile Asn Cys Ser Ser Asn Ile 420 425 430
- Thr Gly Leu Leu Thr Arg Asp Gly Gly Ala Asn Asn Ser Glu Thr
- Phe Arg Pro Gly Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu 450 455 460
- Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Leu Ala Pro Thr 465 470 475 480
- Lys Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Ile Gly Leu 485 490 495
- Gly Ala Val Phe Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly 500 505 510
- Ala Ala Ser Leu Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly 515 520 525
- Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln 530 540
- His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg 545 550 555 560

Val Leu Ala Val Glu Ser Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile 565 570 575

Trp Gly Cys Ser Gly Lys His Ile Cys Thr Thr Asn Val Pro Trp Asn 580 585 590

Ser Ser Trp Ser Asn Lys Ser Leu Glu Glu Ile Trp Asp Asn Met Thr 595 600 605

Trp Met Glu Trp Glu Arg Glu Ile Asp Asn Tyr Thr Gly Leu Ile Tyr 610 615 620

Ser Leu Ile Glu Glu Ser Gln Asn Gln Glu Lys Asn Glu Gln Glu 625 630 635 640

Leu Leu Gln Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Ser Ile 645 650 655

Thr Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly
660 665 670

Leu Ile Gly Leu Arg Ile Val Phe Ala Val Leu Ser Leu Val Asn Arg 675 680 685

Val Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Leu Pro Ala 690 695 700

Pro Arg Gly Pro Asp Arg Pro Glu Gly Ile Glu Glu Glu Gly Glu 705 710 715 720

Gln Gly Arg Gly Arg Ser Ile Arg Leu Val Asn Gly Phe Ser Ala Leu 725 730 735

Ile Trp Asp Asp Leu Arg Asn Leu Cys Leu Phe Ser Tyr His Arg Leu 740 745 750

Arg Asp Leu Ile Leu Ile Ala Thr Arg Ile Val Glu Leu Leu Gly Arg
755 760 765

Arg Gly Trp Glu Ala Ile Lys Tyr Leu Trp Asn Leu Leu Gln Tyr Trp
770 780

Ile Gln Glu Leu Lys Asn Ser Ala Ile Ser Leu Leu Asp Thr Thr Ala
785 790 795 800

Ile Ala Val Ala Glu Gly Thr Asp Arg Ala Ile Glu Ile Val Gln Arg

Ala Val Arg Ala Val Leu Asn Ile Pro Thr Arg Ile Arg Gln Gly Leu 820 825 830

Glu Arg Ala Leu Leu 835

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<211> 839
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<212> PRT

<213> Human immunodeficiency virus

<400> 106

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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Asp Ala Asp 35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Ser Thr Glu Lys
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Ile Pro Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Lys 85 90 95

Asn Asn Met Val Glu Gln Met His Glu Asp Ile Ile Ser Leu Trp Asp 100 105 110

Glu Ser Leu Lys Pro Cys Val Lys Leu Thr Pro Leu Cys Val Thr Leu 115 120 125

Asn Cys Thr Asp Val Lys Asn Ala Thr Asn Thr Thr Val Glu Ala Ala 130 135 140

Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr Glu Ile Lys Asp Lys 145 150 155 160

Lys Lys Glu Tyr Ala Leu Phe Tyr Lys Leu Asp Val Val Pro Ile 165 170 175

Asn Asp Asn Asn Ser Ile Tyr Arg Leu Ile Asn Cys Asn Val Ser 180 185 190

Thr Val Lys Gln Ala Cys Pro Lys Val Thr Phe Glu Pro Ile Pro Ile 195 200 205

His Tyr Cys Ala Pro Ala Gly Phe Ala Ile Leu Lys Cys Asn Asp Lys 210 215 220

Lys Phe Asn Gly Thr Gly Pro Cys Lys Asn Val Ser Thr Val Gln Cys 225 230 235 240

Thr His Gly Ile Lys Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly
245 250 255

Ser Leu Ala Glu Gly Glu Val Arg Ile Arg Ser Glu Asn Phe Thr Asn 260 265 270

Asn Ala Lys Thr Ile Ile Val Gln Leu Asn Ser Ser Val Arg Ile Asn

Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Ser Ile His Ile Gly Pro 295 290 Gly Gln Ala Phe Tyr Ala Thr Gly Asp Ile Ile Gly Asp Ile Arg Gln 315 Ala His Cys Asn Ile Ser Arg Ala Glu Trp Asn Asn Thr Leu Gln Gln 330 Val Ala Lys Gln Leu Arg Glu Asn Phe Asn Lys Thr Ile Ile Phe Asn Asn Pro Ser Gly Gly Asp Leu Glu Ile Thr Thr His Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Ser Arg Leu Phe Asn Ser Thr 375 380 Trp Asn Asn Asp Thr Arg Asn Asp Thr Lys Gln Met His Ile Thr Leu 395 390 Pro Cys Arg Ile Lys Gln Ile Val Asn Met Trp Gln Arg Val Gly Gln 410 Ala Met Tyr Ala Pro Pro Ile Gln Gly Lys Ile Arg Cys Asn Ser Asn 420 425 Ile Thr Gly Leu Leu Thr Arg Asp Gly Gly Asn Asn Asn Thr Asn Glu Thr Phe Arg Pro Thr Gly Gly Asp Met Arg Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Glu Ile Lys Pro Leu Gly Val Ala 465 470 Pro Thr Arg Ala Lys Arg Arg Val Val Glu Arg Glu Lys Arg Ala Val 490 Gly Ile Gly Ala Val Leu Leu Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Ile Thr Leu Thr Val Gln Ala Arg Gln Leu Leu 520 Ser Gly Ile Val Gln Gln Ser Asn Leu Leu Lys Ala Ile Glu Ala 535 Gln Gln His Leu Leu Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln 555 545 Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu 570

Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Asn Val Pro

580 585 590

- Trp Asn Phe Ser Trp Ser Asn Lys Ser Tyr Asp Glu Ile Trp Asp Asn 595 600 605
- Met Thr Trp Ile Glu Trp Glu Arg Glu Ile Asn Asn Tyr Thr Gln Thr 610 615 620
- Ile Tyr Thr Leu Leu Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu 625 630 635 640
- Gln Asp Leu Leu Ala Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe 645 650 655
- Asp Ile Ser Asn Trp Leu Trp Tyr Ile Lys Ile Phe Ile Met Ile Val 660 665 670
- Gly Gly Leu Ile Gly Leu Arg Ile Ile Phe Ala Val Leu Ser Ile Val 675 680 685
- Asn Arg Cys Arg Gln Gly Tyr Ser Pro Leu Ser Phe Gln Thr Leu Thr 690 700
- Pro Asn His Lys Glu Ala Asp Arg Pro Gly Gly Ile Glu Glu Gly 705 710 715 720
- Gly Glu Gln Asp Arg Thr Arg Ser Ile Arg Leu Val Ser Gly Phe Leu
 725 730 735
- Ala Leu Ala Trp Asp Asp Leu Arg Asn Leu Cys Leu Phe Ser Tyr His
 740 745 750
- Arg Leu Arg Asp Phe Ile Leu Ile Ala Ala Arg Ile Val Glu Thr Leu 755 760 765
- Gly Arg Arg Gly Trp Glu Ile Leu Lys Tyr Leu Gly Asn Leu Ala Gln 770 785
- Tyr Trp Gly Gln Glu Leu Lys Asn Ser Ala Ile Ser Leu Leu Asn Ala 785 790 795 800
- Thr Ala Ile Ala Val Ala Glu Gly Thr Asp Arg Ile Ile Glu Val Val 805 810 815
- His Arg Val Leu Arg Ala Ile Leu His Ile Pro Arg Arg Ile Arg Gln 820 825 830
- Gly Phe Glu'Arg Ala Leu Leu 835

<210> 107

<211> 2514

<212> DNA

<213> Human immunodeficiency virus

<400> 107

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<212> DNA
<213> Human immunodeficiency virus
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<211> 838
<212> PRT
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Gln	Ser	Leu 115	Lys	Pro	Cys	Val	Lys 120	Leu	Thr	Pro	Leu	Cys 125	Val	Thr	Leu
Asn	Cys 130	Thr	Asp	Ala	Asn	Ala 135	Thr	Ala	Asn	Ala	Thr 140	Lys	Glu	His	Pro
Glu 145	Gly	Arg	Ala	Gly	Ala 150	Ile	Gln	Asn	Cys	Ser 155	Phe	Asn	Met	Thr	Thr 160
Glu	Val	Arg	Asp	Lys 165	Gln	Met	Lys	Val	Gln 170	Ala	Leu	Phe	Tyr	Arg 175	Leu
Asp	Ile	Val	Pro 180	Ile	Ser	Asp	Asn	Asn 185	Ser	Asn	Glu	Tyr	Arg 190	Leu	Ile
Asn	Cys	Asn 195	Thr	Ser	Thr	Ile	Thr 200	Gln	Ala	Cys	Pro	Lys 205	Val	Ser	Trp
Asp	Pro 210	Ile	Pro	Ile	His	Tyr 215	Cys	Ala	Pro	Ala	Gly 220	Tyr	Ala	Ile	Leu
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Ser	Val 290	Gln	Ile	Asn	Cys	Thr 295	Arg	Pro	Asn	Asn	Asn 300	Thr	Arg	Lys	Ser
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Ala	Ala	Pro	Ile 420	Ala	Gly	Asn	Ile	Thr 425	Cys	Thr	Ser	Asn	Ile 430	Thr	Gly
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Tyr 625	Arg	Leu	Ile	Glu	Glu 630	Ser	Gln	Asn	Gln	Gln 635	Glu	Lys	Asn	Glu	Gln 640
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Ile	Ser	Asn	Trp 660	Leu	Trp	Tyr	Ile	Arg 665	Ile	Phe	Ile	Met	Ile 670	Val	Gly
Gly	Leu	Ile 675	Gly	Leu	Arg	Ile	Val 680	Phe	Ala	Val	Leu	Ser 685	Ile	Val	Asn

Arg Val Arg Lys Gly Tyr Ser Pro Leu Ser Leu Gln Thr His Ile Pro 690 695 700

Ser Pro Arg Glu Pro Asp Arg Pro Glu Gly Ile Glu Glu Gly Gly 705 710 715 720

Glu Gln Gly Lys Asp Arg Ser Val Arg Leu Val Asn Gly Phe Leu Ala 725 730 735

Leu Ile Trp Asp Asp Leu Arg Ser Leu Cys Leu Phe Ser Tyr His Arg
740 745 750

Leu Arg Asp Leu Leu Leu Ile Val Thr Arg Ile Val Glu Leu Leu Gly
755 760 765

Arg Arg Gly Trp Glu Val Leu Lys Tyr Trp Trp Asn Leu Leu Gln Tyr 770 775 780

Trp Ser Gln Glu Leu Lys Asn Ser Ala Ile Ser Leu Leu Asn Thr Thr 785 790 795 800

Ala Ile Val Val Ala Glu Gly Thr Asp Arg Val Ile Glu Ala Leu Gln 805 810 815

Arg Val Gly Arg Ala Ile Leu Asn Ile Pro Arg Arg Ile Arg Gln Gly 820 825 830

Leu Glu Arg Ala Leu Leu 835

<210> 110

<211> 855

<212> PRT

<213> Human immunodeficiency virus

<400> 110

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Leu Trp Val Thr Val Tyr Tyr Gly Val Pro Val Trp Lys Glu Ala Thr
35 40 45

Thr Thr Leu Phe Cys Ala Ser Asp Ala Lys Ala Tyr Asp Ala Glu Val
50 55 60

His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr Asp Pro Asn Pro 65 70 75 80

Gln Glu Val Ala Leu Glu Asn Val Thr Glu Asn Phe Asn Met Trp Glu 85 90 95

Asn Asn Met Val Asp Gln Met Gln Glu Asp Ile Ile Ser Leu Trp Asp

Gln Ser Leu Lys Pro Cys Val Glu Leu Thr Pro Leu Cys Val Thr Leu Asn Cys Thr Asp Phe Asn Asn Thr Thr Asn Asn Thr Thr Asn Thr Arg Asn Asp Gly Glu Gly Glu Ile Lys Asn Cys Ser Phe Asn Ile Thr Thr 155 Ser Leu Arg Asp Lys Ile Lys Lys Glu Tyr Ala Leu Phe Tyr Asn Leu 165 170 Asp Val Val Gln Met Asp Asn Asp Asn Ser Ser Tyr Arg Leu Thr Ser 185 Cys Asn Thr Ser Ile Ile Thr Gln Ala Cys Pro Lys Val Ser Phe Thr 195 205 Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly Phe Val Ile Leu Lys 215 Cys Asn Asn Lys Thr Phe Asn Gly Thr Gly Pro Cys Thr Asn Val Ser 235 230 Thr Val Gln Cys Thr His Gly Ile Arg Pro Val Val Ser Thr Gln Leu Leu Leu Asn Gly Ser Leu Ala Glu Glu Glu Ile Val Ile Arq Ser Lys Asn Phe Thr Asp Asn Ala Lys Thr Ile Ile Val Gln Leu Lys Asp Pro 275 Ile Glu Ile Asn Cys Thr Arg Pro Asn Asn Asn Thr Arg Lys Arg Ile 295 Thr Met Gly Pro Gly Arg Val Leu Tyr Thr Thr Gly Gln Ile Ile Gly 310 315 Asp Ile Arg Lys Ala His Cys Asn Ile Ser Lys Thr Lys Trp Asn Asn 325 Thr Leu Gly Gln Ile Val Lys Lys Leu Arg Glu Gln Phe Met Asn Lys Thr Ile Val Phe Gln Arg Ser Ser Gly Gly Asp Pro Glu Ile Val Met His Ser Phe Asn Cys Gly Gly Glu Phe Phe Tyr Cys Asn Thr Thr Gln 375 Leu Phe Asn Ser Thr Trp Arg Ser Asn Ser Thr Trp Asn Asp Thr Thr 390 395

Glu Thr Asn Asn Thr Asp Leu Ile Thr Leu Pro Cys Arg Ile Lys Gln

405

Ile Val Asn Met Trp Gln Lys Val Gly Lys Ala Met Tyr Ala Pro Pro 425 Ile Ser Gly Gln Ile Arg Cys Ser Ser Asn Ile Thr Gly Leu Leu Ile Arg Asp Gly Gly Ser Asn Asn Thr Glu Thr Phe Arg Pro Gly Gly 455 Gly Asn Met Lys Asp Asn Trp Arg Ser Glu Leu Tyr Lys Tyr Lys Val Val Lys Ile Glu Pro Leu Gly Val Ala Pro Thr Arg Ala Lys Arg Arg Val Val Gln Arg Glu Lys Arg Ala Val Gly Ile Gly Ala Leu Leu Phe 500 505 Gly Phe Leu Gly Ala Ala Gly Ser Thr Met Gly Ala Ala Ser Met Thr 520 Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln 535 Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu Gln Leu 545 555 Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln Gln Leu Leu Gly Ile Trp Gly Cys Ser Gly Lys Leu Ile Cys Thr Thr Thr Val Pro Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Asp Asp Ile Trp Asn Asn Met Thr Trp Met Glu Trp Glu 615 Arg Glu Ile Asp Asn Tyr Thr Gly Leu Ile Tyr Thr Leu Ile Glu Gln 625 Ser Gln Asn Gln Glu Arg Asn Glu Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe Asn Ile Thr Asn Trp Leu Trp 665 Tyr Ile Lys Ile Phe Ile Met Ile Ile Gly Gly Leu Ile Gly Leu Arg 675 Ile Val Phe Ala Val Leu Ser Ile Ile Asn Arg Val Arg Lys Gly Tyr

Ser Pro Leu Ser Phe Gln Thr Leu Thr His His Gln Arg Glu Pro Asp

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Arg Pro Gly Arg Ile Glu Glu Glu Gly Gly Glu Gln Asp Lys Asp Arg
725 730 735

Ser Ile Arg Leu Val Ser Gly Phe Leu Ala Leu Ala Trp Asp Asp Leu
740 745 750

Arg Ser Leu Cys Leu Phe Ser Tyr His Arg Leu Arg Asp Phe Ile Leu 755 760 765

Ile Ala Arg Thr Val Glu Leu Leu Gly Arg Ser Ser Leu Lys Gly
770 780

Leu Arg Leu Gly Trp Glu Gly Leu Lys Tyr Leu Trp Asn Leu Leu 785 790 795 800

Tyr Trp Gly Arg Glu Leu Lys Asn Ser Ala Ile Asn Leu Leu Asp Thr 805 810 815

Val Ala Ile Ala Val Ala Asn Trp Thr Asp Arg Ala Ile Glu Val Val 820 825 830

Gln Arg Val Gly Arg Ala Val Leu Asn Ile Pro Val Arg Ile Arg Gln 835 840 845

Gly Leu Glu Arg Ala Leu Leu 850 855

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<212> DNA

<213> Human immunodeficiency virus

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<400> 112

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Gly Leu Leu Glu Thr Ser Glu Gly Cys Gln Gln Ile Ile Glu Gln Leu
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Gln Pro Ala Leu Gln Thr Gly Ser Glu Glu Leu Arg Ser Leu Tyr Asn
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                     70
                                         75
Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Glu Val Lys Asp
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Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Asn Lys Ser Lys
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                                                    110
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Gln Lys Thr Gln Gln Ala Ala Ala Asp Thr Gly Asn Ser Ser Lys Val

Ser Gln Asn Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His

Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val Glu

Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser

Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly

135

150

115

145

125

155

170

180 185 190

G	ly	His	Gln 195	Ala	Ala	Met	Gln	Met 200	Leu	Lys	Asp	Thr	Ile 205	Asn	Glu	Glu
A	la	Ala 210	Glu	Trp	Asp	Arg	Leu 215	His	Pro	Val	His	Ala 220	Gly	Pro	Ile	Pro
	ro 25	Gly	Gln	Met	Arg	Glu 230	Pro	Arg	Gly	Ser	Asp 235	Ile	Ala	Gly	Thr	Thr 240
S	er	Thr	Leu	Gln	Glu 245	Gln	Ile	Gly	Trp	Met 250	Thr	Ser	Asn	Pro	Pro 255	Ile
P	ro	Val	Gly	Glu 260	Ile	Tyr	Lys	Arg	Trp 265	Ile	Ile	Leu	Gly	Leu 270	Asn	Lys
Ι	le	Val	Arg 275	Met	Tyr	Ser	Pro	Val 280	Ser	Ile	Leu	Asp	Ile 285	Arg	Gln	Gly
P	ro	Lys 290	Glu	Pro	Phe	Arg	Asp 295	Tyr	Val	Asp	Arg	Phe 300	Phe	Lys	Thr	Leu
	rg 05	Ala	Glu	Gln	Ala	Thr 310	Gln	Asp	Val	Lys	Asn 315	Trp	Met	Thr	Asp	Thr 320
L	eu	Leu	Val	Gln	Asn 325	Ala	Asn	Pro	Asp	Cys 330	Lys	Thr	Ile	Leu	Lys 335	Ala
L	eu	Gly	Pro	Gly 340	Ala	Thr	Leu	Glu	Glu 345	Met	Met	Thr	Ala	Cys 350	Gln	Gly
V	al	Gly	Gly 355	Pro	Ser	His	Lys	Ala 360	Arg	Val	Leu	Ala	Glu 365	Ala	Met	Ser
G	ln	Val 370	Thr	Asn	Thr	Thr	Ile 375	Met	Met	Gln	Arg	Gly 380	Asn	Phe	Lys	Gly
	ln 85	Lys	Arg	Ile	Ile	Lys 390	Cys	Phe	Asn	Cys	Gly 395	Lys	Glu	Gly	His	Ile 400
A	la	Arg	Asn	Cys	Arg 405	Ala	Pro	Arg	Lys	Lys 410	Gly	Cys	Trp	Lys	Cys 415	Gly
Ŀ	ys	Glu	Gly	His 420	Gln	Met	Lys	Asp	Cys 425	Thr	Glu	Arg	Gln	Ala 430	Asn	Phe
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G.	ln	Ser 450	Arg	Pro	Glu	Pro	Thr 455	Ala	Pro	Pro	Ala	Glu 460	Ser	Phe	Gly	Phe
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Ser Gln

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His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro
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Gly Leu Leu Glu Thr Ala Glu Gly Cys Gln Gln Ile Met Gly Gln Leu
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                         55
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Gln 65	Pro	Ala	Leu	Gln	Thr 70	Gly	Thr	Glu	Glu	Leu 75	Arg	Ser	Leu	Tyr	Asn 80
Thr	Val	Ala	Thr	Leu 85	Tyr	Cys	Val	His	Gln 90	Arg	Ile	Glu	Val	Lys 95	Asp
Thr	Lys	Glu	Ala 100	Leu	Asp	Lys	Ile	Glu 105	Glu	Glu	Gln	Asn	Lys 110	Ser	Gln
Gln	Lys	Thr 115	Gln	Gln	Ala	Ala	Ala 120	Asp	Lys	Gly	Asp	Ser 125	Ser	Gln	Val
Ser	Gln 130	Asn	Tyr	Pro	Ile	Val 135	Gln	Asn	Leu	Gln	Gly 140	Gln	Met	Val	His
Gln 145	Ala	Ile	Ser	Pro	Arg 150	Thr	Leu	Asn	Ala	Trp 155	Val	Lys	Val	Val	Glu 160
Glu	Lys	Ala	Phe	Ser 165	Pro	Glu	Val	Ile	Pro 170	Met	Phe	Ser	Ala	Leu 175	Ser
Glu	Gly	Ala	Thr 180	Pro	Gln	Asp	Leu	Asn 185	Thr	Met	Leu	Asn	Thr 190	Val	Gly
Gly	His	Gln 195	Ala	Ala	Met	Gln	Met 200	Leu	Lys	Asp	Thr	Ile 205	Asn	Glu	Glu
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Ser	Thr	Leu	Gln	Glu 245	Gln	Ile	Gly	Trp	Met 250	Thr	Ser	Asn	Pro	Pro 255	Ile
Pro	Val	Gly	Glu 260	Ile	Tyr	Lys	Arg	Trp 265	Ile	Ile	Leu	Gly	Leu 270	Asn	Lys
Ile	Val	Arg 275	Met	Tyr	Ser	Pro	Val 280	Ser	Ile	Leu	Asp	Ile 285	Arg	Gln	Gly
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Leu	Gly	Pro	Gly 340	Ala	Thr	Leu	Glu	Glu 345	Met	Met	Thr	Ala	Cys 350	Gln	Gly
Val	Gly	Gly 355	Pro	Gly	His	Lys	Ala 360	Arg	Val	Leu	Ala	Glu 365	Ala	Met	Ser

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Pro Arg Arg Ile Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile
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Ala Arg Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly
                                     410
                405
Lys Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe
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            420
Leu Gly Lys Ile Trp Pro Ser Asn Lys Gly Arg Pro Gly Asn Phe Leu
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Gln Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Gly Phe
    450
Gly Glu Glu Ile Thr Pro Ser Pro Lys Gln Glu Pro Lys Asp Lys Glu
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                    470
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Leu Tyr Pro Leu Ala Ser Leu Lys Ser Leu Phe Gly Ser Asp Pro Leu

490

Ser Gln

<210> 116 <211> 1497

<212> DNA

<213> Human immunodeficiency virus

485

<400> 116

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<213> Human immunodeficiency virus

<400> 117

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Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Arg Leu Lys
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His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro 35 40 45

Ser Leu Leu Glu Thr Thr Glu Gly Cys Gln Gln Ile Met Glu Gln Leu 50 55 60

Gln Pro Ala Leu Lys Thr Gly Thr Glu Glu Leu Arg Ser Leu Tyr Asn 65 70 75 80

Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Asp Val Lys Asp 85 90 95

Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Ile Gln Asn Lys Ser Lys
100 105 110

Gln Lys Thr Gln Gln Ala Ala Ala Asp Thr Gly Asn Ser Ser Lys Val

Ser Gln Asn Tyr Pro Ile Val Gln Asn Ala Gln Gly Gln Met Val His 130 135 140

Gln Ser Leu Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu 145 150 155 160

Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser 165 170 175

Glu Gly Ala Thr Pro Gln Asp Leu Asn Met Met Leu Asn Ile Val Gly 180 185 190

Gly His Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu
195 200 205

Ala Ala Glu Trp Asp Arg Leu His Pro Val His Ala Gly Pro Ile Pro 210 215 220

Pro Gly Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr 225 230 235 240

Ser Thr Pro Gln Glu Gln Ile Gly Trp Met Thr Gly Asn Pro Pro Ile 245 250 255 Pro Val Gly Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys
260 265 270

Ile Val Arg Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Lys Gln Gly
275 280 285

Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu 290 295 300

Arg Ala Glu Gln Ala Thr Gln Glu Val Lys Asn Trp Met Thr Glu Thr 305 310 315 320

Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Ser Ile Leu Arg Ala 325 330 335

Leu Gly Pro Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly
340 345 350

Val Gly Gly Pro Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser 355 360 365

Gln Val Gln His Thr Asn Ile Met Met Gln Arg Gly Asn Phe Arg Gly 370 375 380

Gln Lys Arg Ile Lys Cys Phe Asn Cys Gly Lys Glu Gly His Leu Ala 385 390 395 400

Arg Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys
405
410
415

Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu 420 425 430

Gly Lys Ile Trp Pro Ser Ser Lys Gly Arg Pro Gly Asn Phe Pro Gln 435 440 445

Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ile Phe Gly Met Gly 450 455 460

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Ser Gln

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<211> 1497

<212> DNA

<213> Human immunodeficiency virus

<400> 118

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Gly Leu Leu Glu Thr Ala Glu Gly Cys Gln Gln Ile Met Gly Gln Leu
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Gln Pro Ala Leu Lys Thr Gly Thr Glu Glu Leu Arg Ser Leu Tyr Asn
Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Glu Val Lys Asp
Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Ile Gln Asn Lys Ser Lys
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Gln Lys Thr Gln Gln Ala Ala Ala Asp Thr Gly Asn Ser Ser Lys Val

Ser Gln Asn Tyr Pro Ile Val Gln Asn Ala Gln Gly Gln Met Val His

130

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Gly Lys Ile Trp Pro Ser Ser Lys Gly Arg Pro Gly Asn Phe Pro Gln

435 440 445

Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Asn Phe Gly Met Gly 450 Glu Glu Met Ile Ser Ser Pro Lys Gln Glu Gln Lys Asp Arg Glu Gln 470 475 Tyr Pro Pro Leu Val Ser Leu Lys Ser Leu Phe Gly Asn Asp Pro Leu 485 490 Ser Gln <210> 120 <211> 1497 <212> DNA <213> Human immunodeficiency virus <400> 120 atgggcgccc gcgcctccgt gctgtccggc ggcaagctgg acgcctggga gaagatccgc 60 ctgcgccccg gcggcaagaa gaagtaccgc ctgaagcacc tggtgtgggc ctcccgcgag 120 ctggageget tegecetgaa eeeeggeetg etggagaeeg eegagggetg eeageagate 180 atgggccagc tgcagcccgc cctgaagacc ggcaccgagg agctgcgctc cctgtacaac 240 acceptageca ceetgtacte egtgeaccae egcategage tgaaggacae caaggagec 300 ctggacaaga tcgaggagat ccagaacaag tccaagcaga agacccagca ggccgccgcc 360 gacaccggca actectecaa ggtgteecag aactacceca tegtgeagaa egeecaggge 420 cagatggtqc accagtccct gtcccccgc accctgaacg cctgggtgaa ggtgatcgag 480 gagaaggeet teteeceega ggtgateece atgtteteeg eeetgteega gggegeeace 540 ccccaggacc tgaacatgat gctgaacatc gtgggcggc accaggccgc catgcagatg 600 ctgaaggaca ccatcaacga ggaggccgcc gagtgggacc gcctgcaccc cgtgcacgcc 660 ggccccatcc ccccggcca gatgcgcgag ccccgcggct ccgacatcgc cggcaccacc 720 tccaccctgc aggagcagat cggctggatg accggcaacc cccccatccc cgtgggcgac 780 atctacaagc gctggatcat cctgggcctg aacaagatcg tgcgcatgta ctcccccgtg 840 tecateetgg acateegeca gggccccaag gagccettee gegactaegt ggacegette 900 ttcaaqaccc tqcqcgccga gcaggccacc caggaqqtqa agaactggat gaccgaqacc 960 ctgctggtgc agaacgccaa ccccgactgc aagtccatcc tgcgcgccct gggccccggc 1020 gccaccctgg aggagatgat gaccgcctgc cagggcgtgg gcggccccgg ccacaaggcc 1080 cgcgtgctgg ccgaggccat gtcccaggtg cagaacaccg acatcatgat gcagcgcggc 1140 aacttccgcg gccccaagcg catcaagtgc ttcaactgcg gcaaggaggg ccacctggcc 1200 cgcaactgcc gcgcccccg caagaagggc tgctggaagt gcggcaagga gggccaccag 1260 atgaaggact gcaccgagcg ccaggccaac ttcctgggca agatctggcc ctcctccaag 1320 ggccgccccg gcaacttccc ccagtcccgc cccgagccca ccgcccccc cgccgagaac 1380 ttcqqcatqq qcgaggagat gatctcctcc cccaagcagg agcagaagga ccgcgagcag 1440 taccccccc tggtgtccct gaagtccctg ttcggcaacg accccctgtc ccagtaa <210> 121 <211> 500 <212> PRT <213> Human immunodeficiency virus <400> 121

Met Gly Ala Arg Ala Ser Ile Leu Ser Gly Gly Lys Leu Asp Ala Trp

5

Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Arg Leu Lys 20 His Leu Val Trp Ala Ser Arg Glu Leu Glu Lys Phe Ser Ile Asn Pro Ser Leu Leu Glu Thr Ser Glu Gly Cys Arg Gln Ile Ile Arg Gln Leu Gln Pro Ala Leu Gln Thr Gly Thr Glu Glu Leu Lys Ser Leu Tyr Asn Thr Val Ala Val Leu Tyr Cys Val His Gln Arg Ile Asp Val Lys Asp 90 Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Asn Lys Cys Lys 105 Gln Lys Thr Gln His Ala Ala Ala Asp Thr Gly Asn Ser Ser Ser Ser Gln Asn Tyr Pro Ile Val Gln Asn Ala Gln Gly Gln Met Val His 135 Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val Glu 145 Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Thr Ala Leu Ser Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly 185 Gly His Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu 200 Ala Ala Glu Trp Asp Arg Leu His Pro Val His Ala Gly Pro Ile Pro 215 Pro Gly Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr 240 225 Ser Thr Leu Gln Glu Gln Ile Gly Trp Met Thr Ser Asn Pro Pro Ile Pro Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys 265 Ile Val Arg Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly 275 Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu 300 295 Arg Ala Glu Gln Ala Thr Gln Glu Val Lys Asn Trp Met Thr Asp Thr

320

315

310

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Leu Gly Pro Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly
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Val Gly Gly Pro Ser His Lys Ala Arg Val Leu Ala Glu Ala Met Ser
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Gln Val Gln Asn Thr Asn Thr Asn Ile Met Met Gln Arg Gly Asn Phe
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Arg Gly Gln Lys Arg Ile Lys Cys Phe Asn Cys Gly Lys Glu Gly His
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Leu Ala Arg Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys
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Gly Lys Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn
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Phe Leu Gly Lys Ile Trp Pro Ser Asn Lys Gly Arg Pro Gly Asn Phe
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Pro Gln Ser Arg Thr Glu Pro Thr Ala Pro Pro Ala Glu Asn Leu Arg
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Met Gly Glu Glu Ile Thr Ser Ser Leu Lys Gln Glu Leu Lys Thr Arg
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tecaccetge aggageagat eggetggatg acetecaace eccecatece egtgggegag 780
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Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Ser Ile Leu Arg Ala

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<210> 123

<211> 488

<212> PRT

<213> Human immunodeficiency virus

<400> 123

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Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Lys Leu Lys
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His Ile Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Val Asn Pro 35 40 45

Gly Leu Leu Glu Thr Ser Glu Gly Cys Arg Gln Ile Leu Gly Gln Leu 50 55 60

Gln Pro Ser Leu Gln Thr Gly Ser Glu Glu Leu Arg Ser Leu Tyr Asn 65 70 75 80

Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Glu Val Lys Asp
85 90 95

Thr Lys Glu Ala Leu Glu Lys Ile Glu Glu Glu Gln Asn Lys Ser Lys
100 105 110

Lys Lys Ala Gln Gln Ala Ala Asp Thr Gly Asn Ser Ser Gln Val

Ser Gln Asn Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His 130 135 140

Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser 165 170 175

Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly 180 185 190

Gly His Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu Glu

Ala	Ala 210	Glu	Trp	Asp	Arg	Leu 215	His	Pro	Val	His	Ala 220	Gly	Pro	Ile	Ala
Pro 225	Gly	Gln	Met	Arg	Glu 230	Pro	Arg	Gly	Ser	Asp 235	Ile	Ala	Gly	Thr	Thr 240
Ser	Thr	Leu	Gln	Glu 245	Gln	Ile	Gly	Trp	Met 250	Thr	Asn	Asn	Pro	Pro 255	Ile
Pro	Val	Gly	Glu 260	Ile	Tyr	Lys	Arg	Trp 265	Ile	Ile	Leu	Gly	Leu 270	Asn	Lys
Ile	Val	Arg 275	Met	Tyr	Ser	Pro	Thr 280	Ser	Ile	Leu	Asp	Ile 285	Arg	Gln	Gly
Pro	Lys 290	Glu	Pro	Phe	Arg	Asp 295	Tyr	Val	Asp	Arg	Phe 300	Tyr	Lys	Thr	Leu
Arg 305	Ala	Glu	Gln	Ala	Ser 310	Gln	Glu	Val	Lys	Asn 315	Trp	Met	Thr	Glu	Thr 320
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Val	Gly	Gly 355	Pro	Gly	His	Lys	Ala 360	Arg	Val	Leu	Ala	Glu 365	Ala	Met	Ser
Gln	Val 370	Thr	Asn	Ser	Ala	Thr 375	Ile	Met	Met	Gln	Arg 380	Gly	Asn	Phe	Arg
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Ile	Ala	Lys	Asn	Cys 405	Arg	Ala	Pro	Arg	Lys 410	Lys	Gly	Cys	Trp	Lys 415	Cys
Gly	Lys	Glu	Gly 420	His	Gln	Met	Lys	Asp 425	Cys	Thr	Glu	Arg	Gln 430	Ala	Asn
Phe	Leu	Gly 435	Lys	Ile	Trp	Pro	Ser 440	His	Lys	Gly	Arg	Pro 445	Gly	Asn	Phe
Leu	Gln 450	Ser	Arg	Pro	Glu	Pro 455	Thr	Ala	Pro	Pro	Glu 460	Glu	Ser	Phe	Arg
Phe 465	Gly	Glu	Glu	Thr	Thr 470	Thr	Pro	Ser	Gln	Lys 475	Gln	Glu	Pro	Ile	Asp 480
Lys	Glu	Leu	Tyr	Pro 485	Leu	Ala	Ser								

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<211> 1467
<212> DNA
<213> Human immunodeficiency virus
<400> 124
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<211> 500
<212> PRT
<213> Human immunodeficiency virus
<400> 125
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Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Lys Leu Lys
His Ile Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Val Asn Pro
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Gly Leu Leu Glu Thr Ser Glu Gly Cys Arg Gln Ile Leu Gly Gln Leu
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                         55
Gln Pro Ala Leu Gln Thr Gly Ser Glu Glu Leu Arg Ser Leu Tyr Asn
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                     70
Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Glu Val Lys Asp
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Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Asn Lys Ser Lys 100 105 Lys Lys Ala Gln Gln Ala Ala Ala Asp Thr Gly Asn Ser Ser Gln Val 120 Ser Gln Asn Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His 130 135 Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val Glu 155 150 Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser 170 Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu Glu 200 Ala Ala Glu Trp Asp Arg Leu His Pro Val His Ala Gly Pro Ile Ala 215 Pro Gly Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr 240 225 230 235 Ser Thr Leu Gln Glu Gln Ile Gly Trp Met Thr Asn Asn Pro Pro Ile 250 Pro Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys 265 Ile Val Arg Met Tyr Ser Pro Ile Ser Ile Leu Asp Ile Arg Gln Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Thr Leu 295 Arg Ala Glu Gln Ala Ser Gln Asp Val Lys Asn Trp Met Thr Glu Thr 305 Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala Leu Gly Pro Ala Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly 340 345 350 Val Gly Gly Pro Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Val Thr Asn Ser Thr Thr Ile Met Met Gln Arg Gly Asn Phe Arg 375 Asp Gln Arg Lys Ile Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His 385 390 400

Ile Ala Arg Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys 405 Gly Lys Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn 425 Phe Leu Gly Lys Ile Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe 440 Leu Gln Ser Arg Pro Glu Pro Thr Ala Pro Pro Glu Glu Ser Phe Arg 455 Phe Gly Glu Glu Thr Thr Pro Ser Gln Lys Gln Glu Pro Ile Asp 470 475 Lys Glu Leu Tyr Pro Leu Ala Ser Leu Lys Ser Leu Phe Gly Asn Asp 490 Pro Ser Ser Gln 500 <210> 126 <211> 1503 <212> DNA <213> Human immunodeficiency virus <400> 126 atgggcgccc gcgcctccgt gctgtccggc ggcaagctgg acaagtggga gaagatccgc 60 ctgcgccccg gcggcaagaa gaagtacaag ctgaagcaca tcgtgtgggc ctcccgcgag 120 ctqqaqcqct tcqccqtqaa ccccggcctg ctggagacct ccgagggctg ccgccagatc 180 ctgggccagc tgcagcccgc cctgcagacc ggctccgagg agctgcgctc cctgtacaac 240 acceptageca coetqtactq ceptageaccag ceptageaccage teaaggacac caaeggagece 300 ctggacaaga tcgaggagga gcagaacaag tccaagaaga aggcccagca ggccgccgcc 360 gacaccggca actcctccca ggtgtcccag aactacccca tcgtgcagaa cctgcagggc 420 cagatggtgc accaggccat ctcccccgc accetgaacg cetgggtgaa ggtggtggag 480 qaqaaqqcct tctcccccqa ggtgatcccc atgttctccg ccctgtccga gggcgccacc 540 ccccaggacc tgaacaccat gctgaacacc gtgggcggcc accaggccgc catgcagatg 600 ctgaaggaga ccatcaacga ggaggccgcc gagtgggacc gcctgcaccc cgtgcacgcc 660 ggccccatcg ccccggcca gatgcgcgag ccccgcggct ccgacatcgc cggcaccacc 720 tccaccctgc aggagcagat cggctggatg accaacaacc cccccatccc cgtgggcgag 780 atctacaagc gctggatcat cctgggcctg aacaagatcg tgcgcatgta ctcccccatc 840 tccatcctgg acatccgcca gggccccaag gagcccttcc gcgactacgt ggaccgcttc 900 tacaagaccc tgcgcgccga gcaggcctcc caggacgtga agaactggat gaccgagacc 960 ctgctggtgc agaacgccaa ccccgactgc aagaccatcc tgaaggccct gggccccgcc 1020 gccaccctqq aggagatgat gaccgcctgc cagggcgtgg gcggccccgg ccacaaggcc 1080 cgcgtqctqq ccgaggccat gtcccaggtg accaactcca ccaccatcat gatgcagcgc 1140 ggcaacttcc gcgaccagcg caagatcgtg aagtgcttca actgcggcaa ggagggccac 1200 ategecegea aetgeegege eeceegeaag aagggetget ggaagtgegg caaggaggge 1260

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1503

taa

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<212> PRT

<213> Human immunodeficiency virus

<400> 127

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His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro 35 40 45

Gly Leu Leu Glu Thr Ser Glu Gly Cys Lys Gln Ile Ile Lys Gln Leu
50 55 60

Gln Pro Ala Leu Gln Thr Gly Thr Glu Glu Leu Arg Ser Leu Tyr Asn 65 70 75 80

Thr Val Ala Thr Leu Tyr Cys Val His Glu Lys Ile Glu Val Arg Asp
85 90 95

Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Asn Lys Ser Gln
100 105 110

Gln Lys Thr Gln Gln Ala Lys Ala Ala Asp Gly Lys Val Ser Gln Asn 115 120 125

Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His Gln Ala Ile 130 135 140

Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu Glu Lys Ala 145 150 155 160

Phe Ser Pro Glu Val Ile Pro Met Phe Thr Ala Leu Ser Glu Gly Ala 165 170 175

Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His Gln
180 185 190

Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala Glu
195 200 205

Trp Asp Arg Leu His Pro Val His Ala Gly Pro Ile Ala Pro Gly Gln
210 215 220

Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Thr Leu 225 230 235 240

Gln Glu Gln Ile Ala Trp Met Thr Ser Asn Pro Pro Ile Pro Val Gly
245 250 255

Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg 260 265 270

Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Lys Gln Gly Pro Lys Glu

275 280 285

Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala Glu 295 Gln Ala Thr Gln Asp Val Lys Asn Trp Met Thr Asp Thr Leu Leu Val 315 Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Arg Ala Leu Gly Pro 325 330 335 Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly Gly 345 340 Pro Ser His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Ala Asn 360 Asn Thr Asn Ile Met Met Gln Arg Ser Asn Phe Lys Gly Pro Lys Arg 370 375 380 Ile Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile Ala Arg Asn 390 395 385 Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu Gly 405 410 His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly Lys 420 Ile Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe Leu Gln Asn Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Arg Phe Glu Glu Thr 450 455 460 Thr Pro Ala Pro Lys Gln Glu Pro Lys Asp Arg Glu Pro Leu Thr Ser 480 465 470 475 Leu Lys Ser Leu Phe Gly Ser Asp Pro Leu Ser Gln 485 490 <210> 128

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<213> Human immunodeficiency virus

<400> 128

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<213> Human immunodeficiency virus
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                                                 45
Gly Leu Leu Glu Thr Ser Glu Gly Cys Lys Gln Ile Met Lys Gln Leu
Gln Pro Ala Leu Gln Thr Gly Thr Glu Glu Leu Arg Ser Leu Tyr Asn
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                                         75
Thr Val Ala Thr Leu Tyr Cys Val His Glu Arg Ile Glu Val Arg Asp
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Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Asn Lys Ser Gln
Gln Lys Thr Gln Gln Ala Glu Ala Ala Asp Gly Asp Asn Gly Lys Val
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Ser Gln Asn Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His
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                        135
Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val Glu
                                        155
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Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Thr Ala Leu Ser

165

170

Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly 185 Gly His Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu 200 Ala Ala Glu Trp Asp Arg Leu His Pro Val His Ala Gly Pro Val Ala 215 Pro Gly Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr 235 230 Ser Thr Leu Gln Glu Gln Ile Ala Trp Met Thr Ser Asn Pro Pro Ile 250 Pro Val Gly Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys 265 Ile Val Arq Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Lys Gln Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala Glu Gln Ala Thr Gln Asp Val Lys Asn Trp Met Thr Asp Thr 305 315 Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Arg Ala 330 Leu Gly Pro Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly 340 345 350 Val Gly Gly Pro Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Ala Asn Asn Thr Asn Ile Met Met Gln Arg Ser Asn Phe Lys Gly 375 Pro Lys Arg Ile Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile 385 Ala Arg Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe 425 Leu Gly Lys Ile Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe Leu Gln Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Arg Phe

455

470

465

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475

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Thr	Val	Ala	Thr	Leu 85	Tyr	Cys	Val	His	Glu 90	Arg	Ile	Glu	Val	Lys 95	Asp
Thr	Lys	Glu	Ala 100	Leu	Glu	Lys	Ile	Glu 105	Glu	Glu	Gln	Asn	Lys 110	Ser	Lys
Lys	Lys	Ala 115	Gln	Gln	Ala	Ala	Ala 120	Asp	Thr	Gly	Asn	Ser 125	Ser	Gln	Val
Ser	Gln 130	Asn	Tyr	Pro	Ile	Val 135	Gln	Asn	Leu	Gln	Gly 140	Gln	Met	Val	His
Gln 145	Ala	Ile	Ser	Pro	Arg 150	Thr	Leu	Asn	Ala	Trp 155	Val	Lys	Val	Ile	Glu 160
Glu	Lys	Ala	Phe	Ser 165	Pro	Glu	Val	Ile	Pro 170	Met	Phe	Ser	Ala	Leu 175	Ser
Glu	Gly	Ala	Thr 180	Pro	Gln	Asp	Leu	Asn 185	Thr	Met	Leu	Asn	Thr 190	Val	Gly
Gly	His	Gln 195	Ala	Ala	Met	Gln	Met 200	Leu	Lys	Glu	Thr	Ile 205	Asn	Glu	Glu
Ala	Ala 210	Glu	Trp	Asp	Arg	Leu 215	His	Pro	Val	His	Ala 220	Gly	Pro	Val	Ala
Pro 225	Gly	Gln	Met	Arg	Glu 230	Pro	Arg	Gly	Ser	Asp 235	Ile	Ala	Gly	Thr	Thr 240
Ser	Thr	Leu	Gln	Glu 245	Gln	Ile	Gly	Trp	Met 250	Thr	Ser	Asn	Pro	Pro 255	Ile
		_	260		Tyr	_	_	265					270		
		275		_	Ser		280					285			
	290					295					300				Leu
305					Ser 310					315					320
				325	Ala				330					335	
	-		340		Thr			345					350		
	-	355			His	_	360					365			
Gln	Ala	Thr	Asn	ser	Ala	Ala	val	Met	Met	GIn	Arg	GIY	Asn	rne	гÀг

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Gly Pro Arg Lys Ile Ile Lys Cys Phe Asn Cys Gly Lys Glu Gly His
385
Ile Ala Lys Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys
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                                                         415
                405
Gly Lys Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn
                                 425
            420
Phe Leu Gly Lys Ile Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe
                            440
Leu Gln Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Gly
    450
                        455
Phe Gly Glu Glu Ile Thr Pro Ser Gln Lys Gln Glu Gln Lys Asp Lys
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Glu Leu Tyr Pro Leu Thr Ser Leu Lys Ser Leu Phe Gly Asn Asp Pro
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490

495

Leu Ser Gln

<210> 132

<211> 1500 <212> DNA

<213> Human immunodeficiency virus

<400> 132

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<210> 133
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<211> 492

<212> PRT

<213> Human immunodeficiency virus

<400> 133

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Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Arg Met Lys
20 25 30

His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asp Pro 35 40 45

Gly Leu Leu Glu Thr Ser Glu Gly Cys Gln Lys Ile Ile Gly Gln Leu
50 60

Gln Pro Ser Leu Gln Thr Gly Ser Glu Glu Leu Arg Ser Leu Tyr Asn 65 70 75 80

Thr Val Ala Val Leu Tyr Cys Val His Gln Lys Val Glu Val Lys Asp 85 90 95

Thr Lys Glu Ala Leu Glu Lys Leu Glu Glu Glu Gln Asn Lys Ser Gln
100 105 110

Gln Lys Thr Gln Gln Ala Ala Ala Asp Lys Gly Val Ser Gln Asn Tyr 115 120 125

Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His Gln Ala Ile Ser 130 135 140

Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu Glu Lys Ala Phe 145 150 155 160

Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser Glu Gly Ala Thr 165 170 175

Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His Gln Ala 180 185 190

Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala Glu Trp 195 200 205

Asp Arg Leu His Pro Val His Ala Gly Pro Ile Pro Pro Gly Gln Met 210 225 220

Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Thr Leu Gln 225 230 235 240

Glu Gln Ile Gln Trp Met Thr Ser Asn Pro Pro Val Pro Val Gly Asp 245 250 255

Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met

260 265 270

Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly Pro Lys Glu Pro 285

Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala Glu Gln 300

Ala Thr Gln Glu Val Lys Gly Trp Met Thr Asp Thr Leu Leu Val Gln 320

Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala Leu Gly Pro Gly

Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly Pro 340 345 350

330

Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Ala Thr Asn 355 360 365

Thr Ala Ile Met Met Gln Lys Ser Asn Phe Lys Gly Gln Arg Arg Ile 370 375 380

Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile Ala Lys Asn Cys 385 390 395 400

Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Arg Glu Gly His
405 410 415

Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly Lys Ile 420 425 430

Trp Pro Ser Asn Lys Gly Arg Pro Gly Asn Phe Leu Gln Ser Arg Pro
435
440
445

Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Gly Phe Arg Glu Glu Ile 450 455 460

Thr Pro Ser Pro Lys Gln Glu Gln Lys Asp Glu Gly Leu Tyr Pro Pro 465 470 475 480

Leu Ala Ser Leu Lys Ser Leu Phe Gly Asn Asp Pro 485 490

<210> 134

<211> 1479

<212> DNA

<213> Human immunodeficiency virus

<400> 134

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tecceegagg tgateceeat gtteteegee etgteegagg gegeeaceee ceaggacetg 540
aacaccatgc tgaacaccgt gggcggccac caggccgcca tgcagatgct gaaggacacc 600
atcaacgagg aggccgccga gtgggaccgc ctgcaccccg tgcacgccgg ccccatcccc 660
cccggccaga tgcgcgagcc ccgcggctcc gacatcgccg gcaccacctc caccctgcag 720
gagcagatcc agtggatgac ctccaacccc cccgtgcccg tgggcgacat ctacaagcgc 780
tggatcatcc tgggcctgaa caagatcgtg cgcatgtact cccccgtgtc catcctggac 840
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qaqatqatqa ccgcctqcca qqqcqtqggc ggccccggcc acaaggcccg cgtgctggcc 1080
gaggccatgt cccaggccac caacaccgcc atcatgatgc agaagtccaa cttcaagggc 1140
cagegeegea tegtgaagtg etteaactge ggeaaggagg geeacatege caagaactge 1200
cgcgcccccc gcaagaaggg ctgctggaag tgcggccgcg agggccacca gatgaaggac 1260
tgcaccgage gccaggccaa etteetggge aagatetgge cetecaacaa gggcegeece 1320
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cgcgaggaga tcacccctc ccccaagcag gagcagaagg acgagggcct gtacccccc 1440
ctggcctccc tgaagtccct gttcggcaac gacccctaa
                                                                  1479
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Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Tyr Arg Met Lys
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<210> 135 <211> 497 <212> PRT <213> Human immunodeficiency virus <400> 135 His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro Asp Leu Leu Glu Thr Ala Glu Gly Cys Gln Gln Ile Met Gly Gln Leu 55 Gln Pro Ala Leu Gln Thr Gly Thr Glu Glu Leu Arg Ser Leu Phe Asn 65 Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Glu Val Lys Asp 105 110

Thr Lys Glu Ala Leu Glu Glu Val Glu Lys Ile Gln Lys Lys Ser Gln

Gln Lys Thr Gln Gln Ala Ala Met Asp Glu Gly Asn Ser Ser Gln Val 115 120 125

Ser Gln Asn Tyr Pro Ile Val Gln Asn Ala Gln Gly Gln Met Val His 135 140

Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val Glu 160 150 155 145

Glu	Lys	Ala	Phe	Ser 165	Pro	Glu	Val	Ile	Pro 170	Met	Phe	Ser	Ala	Leu 175	Ser
Glu	Gly	Ala	Thr 180	Pro	Gln	Asp	Leu	Asn 185	Thr	Met	Leu	Asn	Thr 190	Val	Gly
Gly	His	Gln 195	Ala	Ala	Met	Gln	Met 200	Leu	Lys	Asp	Thr	Ile 205	Asn	Glu	Glu
Ala	Ala 210	Glu	Trp	Asp	Arg	Met 215	His	Pro	Gln	Gln	Ala 220	Gly	Pro	Ile	Pro
Pro 225	Gly	Gln	Ile	Arg	Glu 230	Pro	Arg	Gly	Ser	Asp 235	Ile	Ala	Gly	Thr	Thr 240
Ser	Thr	Leu	Gln	Glu 245	Gln	Ile	Arg	Trp	Met 250	Thr	Ser	Asn	Pro	Pro 255	Ile
Pro	Val	Gly	Glu 260	Ile	Tyr	Lys	Arg	Trp 265	Ile	Ile	Leu	Gly	Leu 270	Asn	Lys
Ile	Val	Arg 275	Met	Tyr	Ser	Pro	Val 280	Ser	Ile	Leu	Asp	Ile 285	Arg	Gln	Gly
Pro	Lys 290	Glu	Pro	Phe	Arg	Asp 295	Tyr	Val	Asp	Arg	Phe 300	Phe	Lys	Thr	Leu
Arg 305	Ala	Glu	Gln	Ala	Thr 310	Gln	Glu	Val	Lys	Gly 315	Trp	Met	Thr	Asp	Thr 320
Leu	Leu	Val	Gln	Asn 325	Ala	Asn	Pro	Asp	Cys 330	Lys	Thr	Ile	Leu	Arg 335	Ala
Leu	Gly	Pro	Gly 340	Ala	Thr	Leu	Glu	Glu 345	Met	Met	Thr	Ala	Cys 350	Gln	Gly
Val	Gly	Gly 355	Pro	Ser	His	Lys	Ala 360	Arg	Val	Leu	Ala	Glu 365	Ala	Met	Ser
Gln	Ala 370	Ser	Gly	Ala	Ala	Ala 375	Ala	Ile	Met	Met	Gln 380	Lys	Ser	Asn	Phe
Lys 385	Gly	Pro	Arg	Arg	Thr 390	Ile	Lys	Cys	Phe	Asn 395	Cys	Gly	Lys	Glu	Gly 400
His	Leu	Ala	Arg	Asn 405	Cys	Arg	Ala	Pro	Arg 410	Lys	Lys	Gly	Cys	Trp 415	Lys
Cys	Gly	Lys	Glu 420	Gly	His	Gln	Met	Lys 425	Asp	Cys	Thr	Glu	Arg 430	Gln	Ala
Asn	Phe	Leu 435	Gly	Lys	Ile	Trp	Pro 440	Ser	Asn	Lys	Gly	Arg 445	Pro	Gly	Asn
Phe	Leu 450	Gln	Asn	Arg	Pro	Glu 455	Pro	Thr	Ala	Pro	Pro 460	Ala	Glu	Ser	Phe

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Gly Phe Gly Glu Glu Ile Ala Pro Ser Pro Lys Gln Glu Gln Lys Glu
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Lys Glu Leu Tyr Pro Leu Ala Ser Leu Lys Ser Leu Phe Gly Ser Asp
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Pro
<210> 136
<211> 1494
<212> DNA
<213> Human immunodeficiency virus
<400> 136
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ctqqaqcqct tcqccctqaa ccccqacctg ctggagaccg ccgagggctg ccagcagatc 180
atgggccage tgcagcccgc cctgcagacc ggcaccgagg agctgcgctc cctgttcaac 240
acceptagcca ccctgtactg cgtgcaccag cgcatcgagg tgaaggacac caaggaggcc 300
ctggaggagg tggagaagat ccagaagaag tcccagcaga agacccagca ggccgccatg 360
gacgagggca actectecca ggtgteccag aactaceeca tegtgeagaa egeecaggge 420
cagatggtgc accaggccat ctcccccgc accctgaacg cctgggtgaa ggtggtggag 480
gagaaggeet tetecceega ggtgateece atgtteteeg eeetgteega gggegeeace 540
ccccaggacc tgaacaccat gctgaacacc gtgggcggcc accaggccgc catgcagatg 600
ctqaaqqaca ccatcaacqa qqaqqccqcc gagtgggacc gcatgcaccc ccagcaggcc 660
ggececatec ecceggeca gateegegag eccegegget ecgacatege eggeaceace 720
tccaccctgc aggagcagat ccgctggatg acctccaacc ccccatccc cgtgggcgag 780
atctacaagc gctggatcat cctgggcctg aacaagatcg tgcgcatgta ctcccccgtg 840
tccatcctgg acatccgcca gggccccaag gagcccttcc gcgactacgt ggaccgcttc 900
ttcaagaccc tgcgcgccga gcaggccacc caggaggtga agggctggat gaccgacacc 960
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gccgagtcct tcggcttcgg cgaggagatc gcccctccc ccaagcagga gcagaaggag 1440
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<210> 137
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<212> PRT
<213> Human immunodeficiency virus
<400> 137
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His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro
                             40
         35
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Gly	Leu 50	Leu	Glu	Thr	Ala	Glu 55	Gly	Cys	Leu	Gln	Ile 60	Ile	Glu	Gln	Leu
Gln 65	Pro	Ala	Ile	Lys	Thr 70	Gly	Thr	Glu	Glu	Leu 75	Gln	Ser	Leu	Phe	Asn 80
Thr	Val	Ala	Val	Leu 85	Tyr	Cys	Val	His	Gln 90	Arg	Ile	Asp	Val	Lys 95	Asp
Thr	Lys	Glu	Ala 100	Leu	Gly	Lys	Ile	Glu 105	Glu	Ile	Gln	Asn	Lys 110	Ser	Gln
Gln	Lys	Thr 115	Gln	Gln	Ala	Ala	Ala 120	Asp	Lys	Glu	Lys	Asp 125	Asn	Lys	Val
Ser	Gln 130	Asn	Tyr	Pro	Ile	Val 135	Gln	Asn	Ala	Gln	Gly 140	Gln	Met	Val	His
Gln 145	Ala	Ile	Ser	Pro	Arg 150	Thr	Leu	Asn	Ala	Trp 155	Val	Lys	Val	Val	Glu 160
Glu	Lys	Ala	Phe	Ser 165	Pro	Glu	Val	Ile	Pro 170	Met	Phe	Ser	Ala	Leu 175	Ser
Glu	Gly	Ala	Thr 180	Pro	Gln	Asp	Leu	Asn 185	Ala	Met	Leu	Asn	Thr 190	Val	Gly
Gly	His	Gln 195	Ala	Ala	Met	Gln	Met 200	Leu	Lys	Asp	Thr	Ile 205	Asn	Glu	Glu
Ala	Ala 210	Glu	Trp	Asp	Arg	Leu 215	His	Pro	Val	His	Ala 220	Gly	Pro	Ile	Pro
Pro 225	Gly	Gln	Met	Arg	Glu 230	Pro	Arg	Gly	Ser	Asp 235	Ile	Ala	Gly	Thr	Thr 240
Ser	Thr	Leu	Gln	Glu 245	Gln	Ile	Ala	Trp	Met 250	Thr	Gly	Asn	Pro	Pro 255	Ile
Pro	Val	Gly	Asp 260	Ile	Tyr	Lys	Arg	Trp 265	Ile	Ile	Leu	Gly	Leu 270	Asn	Lys
Ile	Val	Arg 275	Met	Tyr	Ser	Pro	Val 280	Ser	Ile	Leu	Asp	Ile 285	Lys	Gln	Gly
Pro	Lys 290	Glu	Pro	Phe	Arg	Asp 295	Tyr	Val	Asp	Arg	Phe 300	Phe	Lys	Thr	Leu
Arg 305	Ala	Glu	Gln	Ala	Thr 310	Gln	Asp	Val	Lys	Asn 315	Trp	Met	Thr	Asp	Thr 320
Leu	Leu	Val	Gln	Asn 325	Ala	Asn	Pro	Asp	Cys 330	Lys	Thr	Ile	Leu	Arg 335	Ala
Leu	Gly	Gln	Gly 340	Ala	Ser	Ile	Glu	Glu 345	Met	Met	Thr	Ala	Cys 350	Gln	Gly

Val Gly Gly Pro Ser His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Val Thr Asn Ala Asn Ala Ala Ile Met Met Gln Lys Gly Asn Phe 370 375 380 Lys Gly Pro Arg Lys Ile Val Lys Cys Phe Asn Cys Gly Lys Glu Gly 385 390 395 His Ile Ala Arg Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys 405 410 Cys Gly Arg Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala 420 Asn Phe Leu Gly Lys Ile Trp Pro Ser Ser Lys Gly Arg Pro Gly Asn 440 Phe Leu Gln Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe 450 455 Gly Phe Gly Glu Glu Met Thr Pro Ser Pro Lys Gln Glu Leu Lys Asp 465 475 Lys Glu Pro Pro Leu Ala Ser Leu Arg Ser Leu Phe Gly Asn Asp Pro 485 490

Leu Ser Gln

<210> 138 <211> 1500 <212> DNA <213> Human immunodeficiency virus

<400> 138

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<210> 139

<211> 495

<212> PRT

<213> Human immunodeficiency virus

<400> 139

Met Gly Ala Arg Ala Ser Val Leu Ser Gly Gly Lys Leu Asp Thr Trp

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Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Arg Leu Lys 20 25 30

His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro 35 40 45

Ser Leu Leu Glu Thr Thr Glu Gly Cys Arg Gln Ile Ile Arg Gln Leu 50 55 60

Gln Pro Ser Leu Gln Thr Gly Ser Glu Glu Leu Lys Ser Leu Phe Asn 65 70 75 80

Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Glu Val Arg Asp
85 90 95

Thr Lys Glu Ala Leu Asp Lys Leu Glu Glu Glu Gln Asn Lys Ser Gln
100 105 110

Gln Lys Thr Gln Gln Glu Thr Ala Asp Lys Gly Val Ser Gln Asn Tyr 115 120 125

Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His Gln Ala Leu Ser 130 135 140

Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu Glu Lys Ala Phe 145 150 155 160

Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser Glu Gly Ala Thr 165 170 175

Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His Gln Ala 180 185 190

Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala Glu Trp 195 200 205

Asp Arg Leu His Pro Val His Ala Gly Pro Ile Pro Pro Gly Gln Met 210 215 220

Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Thr Leu Gln

Glu Gln Ile Thr Trp Met Thr Ser Asn Pro Pro Val Pro Val Gly Glu 245 250 255

Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met 260 265 270

Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly Pro Lys Glu Pro 275 280 285

Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala Glu Gln 290 295 300

Ala Thr Gln Glu Val Lys Asn Trp Met Thr Asp Thr Leu Leu Val Gln 305 310 315 320

Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala Leu Gly Pro Gly 325 330 335

Ala Ser Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly Pro 340 345 350

Gly His Lys Ala Arg Ile Leu Ala Glu Ala Met Ser Gln Val Thr Asn 355 360 365

Thr Ala Val Met Met Gln Arg Gly Asn Phe Lys Gly Gln Arg Lys Ile 370 375 380

Ile Lys Cys Phe Asn Cys Gly Lys Glu Gly His IIe Ala Arg Asn Cys 385 390 395 400

Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu Gly His
405
410
415

Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly Lys Ile 420 425 430

Trp Pro Ser Asn Lys Gly Arg Pro Gly Asn Phe Leu Gln Ser Arg Pro 435 440 445

Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Gly Phe Gly Glu Glu Ile 450 455 460

Thr Pro Ser Pro Arg Gln Glu Thr Lys Asp Lys Glu Gln Gly Pro Pro 465 470 475 480

Leu Thr Ser Leu Lys Ser Leu Phe Gly Asn Asp Pro Leu Ser Gln 485 490 495

<210> 140

<211> 1488

<212> DNA

<213> Human immunodeficiency virus

<400> 140

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cccggccaga tgcgcgagcc ccgcggctcc gacatcgccg gcaccacctc caccctgcag 720
gagcagatca cetggatgac etccaaccc eccgtgeegg tgggegagat etacaagege 780
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<210> 141
<211> 498
<212> PRT
<213> Human immunodeficiency virus
<400> 141
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His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro

Gly Leu Leu Glu Thr Ala Glu Gly Cys Gln Gln Ile Ile Glu Gln Leu

Gln Ser Thr Leu Lys Thr Gly Ser Glu Glu Leu Lys Ser Leu Phe Asn 65 70

Thr Val Ala Thr Leu Trp Cys Val His Gln Arg Ile Glu Val Lys Asp 85

Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Val Gln Asn Lys Ser Gln 105

Gln Lys Thr Gln Gln Ala Ala Ala Gly Thr Gly Ser Ser Lys Val 115 120

Ser Gln Asn 130	Tyr Pro	Ile Val		Asn	Ala	Gln	Gly 140	Gln	Met	Val	His
Gln Pro Leu 145	Ser Pro	Arg Thr 150	Leu	Asn	Ala	Trp 155	Val	Lys	Val	Val	Glu 160
Glu Lys Gly	Phe Asn 165	Pro Glu	Val	Ile	Pro 170	Met	Phe	Ser	Ala	Leu 175	Ser
Glu Gly Ala	Thr Pro 180	Gln Asp	Leu	Asn 185	Met	Met	Leu	Asn	Ile 190	Val	Gly
Gly His Gln 195	Ala Ala	Met Glr	Met 200	Leu	Lys	Glu	Thr	Ile 205	Asn	Ġlu	Glu
Ala Ala Glu 210	Trp Asp	Arg Val		Pro	Val	His	Ala 220	Gly	Pro	Ile	Pro
Pro Gly Gln 225	Met Arg	Glu Pro 230	Arg	Gly	Ser	Asp 235	Ile	Ala	Gly	Thr	Thr 240
Ser Thr Leu	Gln Glu 245	Gln Ile	Gly	Trp	Met 250	Thr	Asn	Asn	Pro	Pro 255	Ile
Pro Val Gly	Asp Ile 260	Tyr Lys	Arg	Trp 265	Ile	Ile	Leu	Gly	Leu 270	Asn	Lys
Ile Val Arg 275	Met Tyr	Ser Pro	Val 280	Ser	Ile	Leu	Asp	Ile 285	Arg	Gln	Gly
Pro Lys Glu 290	Pro Phe	Arg Asp 295		Val	Asp	Arg	Phe 300	Tyr	Lys	Thr	Leu
Arg Ala Glu 305	Gln Ala	Thr Glr	Glu	Val	Lys	Asn 315	Trp	Met	Thr	Glu	Thr 320
Leu Leu Val	Gln Asn 325	Ala Asr	Pro	Asp	Cys 330	Lys	Ser	Ile	Leu	Lys 335	Ala
Leu Gly Thr	Gly Ala 340	Thr Lev	Glu	Glu 345	Met	Met	Thr	Ala	Cys 350	Gln	Gly
Val Gly Gly 355	Pro Ser	His Lys	360	Arg	Val	Leu	Ala	Glu 365	Ala	Met	Ser
Gln Ala Gln 370	His Ala	Asn Ile		Met	Gln	Arg	Gly 380	Asn	Phe	Lys	Gly
Gln Lys Arg 385	Ile Lys	Cys Phe	. Asn	Cys	Gly	Lys 395	Glu	Gly	His	Leu	Ala 400
Arg Asn Cys	Arg Ala 405	Pro Arg	Lys	Lys	Gly 410	Cys	Trp	Lys	Cys	Gly 415	Lys
Glu Gly His	Gln Met 420	Lys Asp	Cys	Thr 425	Glu	Arg	Gln	Ala	Asn 430	Phe	Leu

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Gly Lys Ile Trp Pro Ser Asn Lys Gly Arg Pro Gly Asn Phe Pro Gln
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Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Asn Trp Gly Met Gly
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Glu Glu Ile Thr Ser Leu Pro Lys Gln Glu Gln Lys Asp Lys Glu His
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Pro Pro Pro Leu Val Ser Leu Lys Ser Leu Phe Gly Asn Asp Pro Leu
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Ser Gln
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<211> 1497
<212> DNA
<213> Human immunodeficiency virus
<400> 142
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ctggagcgct tcgccctgaa ccccggcctg ctggagaccg ccgagggctg ccagcagatc 180
ategageage tgeagteeac cetgaagace ggeteegagg agetgaagte cetgtteaac 240
acceptages acceptage control of the 
ctggacaaga tcgaggaggt gcagaacaag tcccagcaga agacccagca ggccgccgcc 360
qqcaccqqct cctcctccaa ggtgtcccag aactacccca tcgtgcagaa cgcccagggc 420
cagatggtgc accageceet gteeceege accetgaacg cetgggtgaa ggtggtggag 480
gagaagggct tcaaccccga ggtgatcccc atgttctccg ccctgtccga gggcgccacc 540
ccccaggacc tgaacatgat gctgaacatc gtgggcggcc accaggccgc catgcagatg 600
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ggccccatcc cccccggcca gatgcgcgag ccccgcggct ccgacatcgc cggcaccacc 720
tccaccetge aggageagat eggetggatg accaacaace eccecatece egtgggegae 780
atctacaagc gctggatcat cctgggcctg aacaagatcg tgcgcatgta ctcccccgtg 840
tocatoctgg acatocgoca gggccccaag gagcccttcc gcgactacgt ggaccgcttc 900
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cgcaactgcc gcgcccccg caagaagggc tgctggaagt gcggcaagga gggccaccag 1260
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tqqqqcatqq qcqaqqaqat cacctccctg cccaagcagg agcagaagga caaggagcac 1440
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<210> 143
<211> 492
<212> PRT
<213> Human immunodeficiency virus
<400> 143
Met Gly Ala Arg Ala Ser Val Leu Ser Gly Gly Lys Leu Asp Ala Trp
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- Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Arg Leu Lys 20 25 30
- His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro 35 40 45
- Gly Leu Leu Glu Thr Ala Glu Gly Cys Gln Gln Ile Met Glu Gln Leu 50 55 60
- Gln Ser Ala Leu Arg Thr Gly Ser Glu Glu Leu Lys Ser Leu Tyr Asn 65 70 75 80
- Thr Val Ala Thr Leu Trp Cys Val His Gln Arg Ile Asp Ile Lys Asp
 85 90 95
- Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Val Gln Asn Lys Ser Lys 100 105 110
- Gln Lys Thr Gln Gln Ala Ala Ala Thr Gly Ser Ser Gln Asn 115 120 125
- Tyr Pro Ile Val Gln Asn Ala Gln Gly Gln Met Thr His Gln Ser Met 130 140
- Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser Glu Gly Ala 165 170 175
- Thr Pro Gln Asp Leu Asn Met Met Leu Asn Ile Val Gly Gly His Gln
 180 185 190
- Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala Glu 195 200 205
- Trp Asp Arg Val His Pro Val His Ala Gly Pro Ile Pro Pro Gly Gln 210 215 220
- Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Thr Leu 225 230 235 240
- Gln Glu Gln Ile Gly Trp Met Thr Ser Asn Pro Pro Ile Pro Val Gly
 245 250 255
- Glu Ile Tyr Lys Arg Trp Ile Val Leu Gly Leu Asn Lys Ile Val Arg 260 265 270
- Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly Pro Lys Glu 275 280 285
- Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala Glu 290 295 300
- Gln Ala Thr Gln Glu Val Lys Asn Trp Met Thr Glu Thr Leu Leu Val 305 310 315 320

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Gln Asn Ala Asn Pro Asp Cys Lys Ser Ile Leu Arg Ala Leu Gly Pro
Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly Gly
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                                                     350
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Pro Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Val Gln
                            360
Gln Ser Asn Ile Met Met Gln Arg Gly Asn Phe Arg Gly Gln Arg Thr
                        375
                                             380
Ile Lys Cys Phe Asn Cys Gly Lys Glu Gly His Leu Ala Arg Asn Cys
385
Lys Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu Gly His
                                     410
Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly Lys Ile
                                425
                                                     430
Trp Pro Ser Ser Lys Gly Arg Pro Gly Asn Phe Pro Gln Ser Arg Pro
Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Gly Met Gly Glu Glu Ile
                        455
Thr Ser Ser Pro Lys Gln Glu Pro Arg Asp Lys Gly Leu Tyr Pro Pro
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465
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Leu Thr Ser Leu Lys Ser Leu Phe Gly Asn Asp Pro
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<210> 144
<211> 1479
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<212> DNA

<213> Human immunodeficiency virus

<400> 144

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<210> 145

<211> 498

<212> PRT

<213> Human immunodeficiency virus

<400> 145

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Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Arg Ile Lys 20 25 30

His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro 35 40 45

Ser Leu Leu Glu Thr Ser Glu Gly Cys Gln Gln Ile Leu Glu Gln Leu 50 55 60

Gln Pro Thr Leu Lys Thr Gly Ser Glu Glu Leu Lys Ser Leu Tyr Asn 65 70 75 80

Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Glu Ile Lys Asp
85 90 95

Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Ile Gln Asn Lys Ser Lys
100 105 110

Gln Lys Thr Gln Gln Ala Ala Thr Gly Thr Gly Ser Ser Ser Lys Val 115 120 125

Ser Gln Asn Tyr Pro Ile Val Gln Asn Ala Gln Gly Gln Met Thr His 130 135 140

Gln Ser Met Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu 145 150 155 160

Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser 165 170 175

Glu Gly Ala Thr Pro Gln Asp Leu Asn Met Met Leu Asn Ile Val Gly 180 185 190

Gly His Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu 195 200 205

Ala Ala Glu Trp Asp Arg Leu His Pro Ala Gln Ala Gly Pro Phe Pro

Pro 225	Gly	Gln	Met	Arg	Glu 230	Pro	Arg	Gly	Ser	Asp 235	Ile	Ala	Gly	Thr	Thr 240
Ser	Thr	Leu	Gln	Glu 245	Gln	Ile	Gly	Trp	Met 250	Thr	Ser	Asn	Pro	Pro 255	Ile
Pro	Val	Gly	Asp 260	Ile	Tyr	Lys	Arg	Trp 265	Ile	Ile	Leu	Gly	Leu 270	Asn	Lys
Ile	Val	Arg 275	Met	Tyr	Ser	Pro	Val 280	Ser	Ile	Leu	Asp	Ile 285	Arg	Gln	Gly
Pro	Lys 290	Glu	Pro	Phe	Arg	Asp 295	Tyr	Val	Asp	Arg	Phe 300	Phe	Lys	Thr	Leu
Arg 305	Ala	Glu	Gln	Ala	Thr 310	Gln	Asp	Val	Lys	Asn 315	Trp	Met	Thr	Glu	Thr 320
Leu	Leu	Val	Gln	Asn 325	Ala	Asn	Pro	Asp	Cys 330	Lys	Thr	Ile	Leu	Arg 335	Ala
Leu	Gly	Ser	Gly 340	Ala	Thr	Leu	Glu	Glu 345	Met	Met	Thr	Ala	Cys 350	Gln	Gly
Val	Gly	Gly 355	Pro	Gly	His	Lys	Ala 360	Arg	Val	Leu	Ala	Glu 365	Ala	Met	Ser
Gln	Val 370	Gln	Asn	Ala	Asn	Ile 375	Met	Met	Gln	Lys	Ser 380	Asn	Phe	Arg	Gly
Pro 385	Lys	Arg	Ile	Lys	Cys 390	Phe	Asn	Cys	Gly	Lys 395	Asp	Gly	His	Leu	Ala 400
Arg	Asn	Cys	Arg	Ala 405	Pro	Arg	Lys	Lys	Gly 410	Cys	Trp	Lys	Cys	Gly 415	Lys
Glu	Gly	His	Gln 420	Met	Lys	Asp	Cys	Thr 425	Glu	Arg	Gln	Ala	Asn 430	Phe	Leu
Gly	Arg	Ile 435	Trp	Pro	Ser	Ser	Lys 440	Gly	Arg	Pro	Gly	Asn 445	Phe	Pro	Gln
Ser	Arg 450	Pro	Glu	Pro	Ser	Ala 455	Pro	Pro	Ala	Glu	Asn 460	Phe	Gly	Met	Gly
Glu 465	Glu	Ile	Thr	Pro	Ser 470	Leu	Lys	Gln	Glu	Gln 475	Lys	Asp	Arg	Glu	Gln 480
His	Pro	Pro	Ser	Ile	Ser	Leu	Lys	Ser	Leu 490	Phe	Gly	Asn	Asp	Pro	Leu

Ser Gln

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<210> 146
<211> 1497
<212> DNA
<213> Human immunodeficiency virus
<400> 146
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ctggageget tegecetgaa eccetecetg etggagaeet eegagggetg eeageagate 180
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qqcaccqqct cctcctcaa qqtqtcccaq aactacccca tcqtqcaqaa cgcccagggc 420
cagatgaccc accagtccat gtccccccgc accctgaacg cctgggtgaa ggtgatcgag 480
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ggccccttcc ccccggcca gatgcgcgag ccccgcggct ccgacatcgc cggcaccacc 720
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<210> 147
<211> 500
<212> PRT
<213> Human immunodeficiency virus
<400> 147
Met Gly Ala Arg Ala Ser Val Leu Ser Gly Gly Lys Leu Asp Ala Trp
Glu Arg Ile Arg Leu Arg Pro Gly Gly Lys Lys Tyr Arg Leu Lys
His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro
Gly Leu Leu Glu Thr Ala Glu Gly Cys Gln Gln Leu Met Glu Gln Leu
Gln Ser Thr Leu Lys Thr Gly Ser Glu Glu Leu Lys Ser Leu Phe Asn
                                         75
Thr Ile Ala Thr Leu Trp Cys Val His Gln Arg Ile Asp Val Lys Asp
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Thr Lys Glu Ala Leu Asp Lys Val Glu Glu Met Gln Asn Lys Ser Lys 105 Gln Lys Thr Gln Gln Ala Ala Ala Asp Thr Gly Gly Ser Ser Asn Val 120 Ser Gln Asn Tyr Pro Ile Val Gln Asn Ala Gln Gly Gln Met Val His 135 Gln Ser Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu 150 155 Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser 170 Glu Gly Ala Thr Pro Gln Asp Leu Asn Met Met Leu Asn Ile Val Gly Gly His Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala Glu Trp Asp Arg Ala His Pro Val His Ala Gly Pro Ile Pro 215 Pro Gly Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr 240 230 235 Ser Thr Leu Gln Glu Gln Ile Gly Trp Met Thr Ser Asn Pro Pro Ile 250 Pro Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys 265 Ile Val Arg Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Cys Leu 295 Arg Ala Glu Gln Ala Thr Gln Glu Val Lys Asn Trp Met Thr Glu Thr 305 Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Ser Ile Leu Lys Ala Leu Gly Thr Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly 350 340 345 Val Gly Gly Pro Ser His Lys Ala Arg Val Leu Ala Glu Ala Met Ser 355 Gln Ala Ser Asn Ala Ala Ala Ile Met Met Gln Lys Ser Asn Phe 375 Lys Gly Gln Arg Arg Ile Ile Lys Cys Phe Asn Cys Gly Lys Glu Gly

390

His Leu Ala Arg Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys 405 410 415

Cys Gly Lys Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala 420 425

Asn Phe Leu Gly Arg Met Trp Pro Ser Ser Lys Gly Arg Pro Gly Asn 435 440 445

Phe Leu Gln Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Leu 450 455 460

Glu Met Lys Glu Glu Thr Thr Ser Ser Pro Lys Gln Glu Pro Arg Asp 465 470 475 480

Lys Glu Leu Tyr Pro Leu Thr Ser Leu Lys Ser Leu Phe Gly Ser Asp 485 490 495

Pro Leu Ser Gln 500

<210> 148 <211> 1503 <212> DNA <213> Human immunodeficiency virus

<400> 148

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<210> 150
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<211> 497

<212> PRT

<213> Human immunodeficiency virus

<400> 150

Met Gly Ala Arg Ala Ser Val Leu Ser Gly Gly Lys Leu Asp Glu Trp
1 5 10 15

Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Arg Leu Lys 20 25 30

His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro 35 40 45

Gly Leu Leu Glu Thr Ala Glu Gly Cys Gln Gln Ile Ile Glu Gln Leu
50 55 60

Gln Ser Ala Leu Lys Thr Gly Ser Glu Glu Leu Lys Ser Leu Tyr Asn 65 70 75 80

Thr Val Ala Thr Leu Tyr Cys Val His Gln Arg Ile Lys Val Thr Asp 85 90 95

Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Ile Gln Asn Lys Ser Lys
100 105 110

Gln Lys Ala Gln Gln Ala Ala Ala Thr Gly Asn Ser Ser Asn Leu 115 120 125

Ser Gln Asn Tyr Pro Ile Val Gln Asn Ala Gln Gly Gln Met Val His 130 135 140

Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu 145 150 155 160

Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser 165 170 175

Glu Gly Ala Thr Pro Gln Asp Leu Asn Met Met Leu Asn Ile Val Gly
180 185 190

Gly His Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu
195 200 205

Ala Ala Glu Trp Asp Arg Val His Pro Val His Ala Gly Pro Ile Pro 210 215 220

Pro Gly Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr 225 230 235 240

Ser Thr Leu Gln Glu Gln Ile Gly Trp Met Thr Ser Asn Pro Pro Ile 245 250 255

Pro Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys

260 265 270

Ile Val Arg Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly 275 280 285

Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu 290 295 300

Arg Ala Glu Gln Ala Thr Gln Glu Val Lys Asn Trp Met Thr Asp Thr 305 310 315 320

Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala 325 330 335

Leu Gly Pro Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly
340 345 350

Val Gly Gly Pro Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser 355 360 365

Gln Ala Ser Gly Thr Glu Ala Ala Ile Met Met Gln Lys Ser Asn Phe 370 380

Lys Gly Pro Lys Arg Ser Ile Lys Cys Phe Asn Cys Gly Lys Glu Gly 385 390 395 400

His Leu Ala Arg Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys
405 410 415

Cys Gly Lys Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala 420 425 430

Asn Phe Leu Gly Lys Ile Trp Pro Ser Asn Lys Gly Arg Pro Gly Asn 435 440 445

Phe Leu Gln Asn Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe 450 455 460

Gly Phe Gly Glu Glu Thr Ala Pro Ser Pro Lys Gln Glu Pro Lys Glu 465 470 475 480

Lys Glu Leu Tyr Pro Leu Ala Ser Leu Lys Ser Leu Phe Gly Asn Asp 485 490 495

Pro

<210> 151

<211> 1494

<212> DNA

<213> Human immunodeficiency virus

<400> 151

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ctggacaaga tcgaggagat ccagaacaag tccaagcaga aggcccagca ggccgccgcc 360
gccaccggca actcctccaa cctgtcccag aactacccca tcgtgcagaa cgcccagggc 420
cagatggtgc accaggccat ctccccccgc accetgaacg cctgggtgaa ggtgatcgag 480
gagaaggeet teteceega ggtgateece atgtteteeg eeetgteega gggegeeace 540
ccccaggacc tgaacatgat gctgaacatc gtgggcggcc accaggccgc catgcagatg 600
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ggccccatcc cccccggcca gatgcgcgag ccccgcggct ccgacatcgc cggcaccacc 720
tecaccetge aggageagat eggetggatg acctecaace eccecatece egtgggegag 780
atctacaagc gctggatcat cctgggcctg aacaagatcg tgcgcatgta ctcccccgtg 840
tecatectgg acatecgeca gggeeceaag gageeettee gegactaegt ggacegette 900
ttcaagaccc tgcgcgccga gcaggccacc caggaggtga agaactggat gaccgacacc 960
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gccgagtcct tcggcttcgg cgaggagacc gcccctccc ccaagcagga gcccaaggag 1440
aaggagetgt acceeetgge etecetgaag teeetgtteg geaacgaeee etaa
<210> 152
<211> 495
<212> PRT
<213> Human immunodeficiency virus
<400> 152
Met Gly Ala Arg Ala Ser Ile Leu Arg Gly Gly Lys Leu Asp Lys Trp
Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys His Tyr Met Leu Lys
                                 25
                                                     30
His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro
                             40
Gly Leu Leu Glu Thr Ser Glu Gly Cys Lys Gln Ile Ile Lys Gln Leu
Gln Pro Ala Leu Gln Thr Gly Thr Glu Glu Leu Arg Ser Leu Phe Asn
 65
                     70
Thr Val Ala Thr Leu Tyr Cys Val His Thr Glu Ile Asp Val Arg Asp
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Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Asn Lys Ile Gln
100 105 110

Gln Lys Thr Gln Gln Ala Lys Glu Ala Asp Gly Lys Val Ser Gln Asn 115 120 125

Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His Gln Pro Ile 130 135 140

Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val Glu Glu Lys Ala

Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser Glu Gly Ala 165 170 175

Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His Gln
180 185 190

Ala Ala Met Gln Ile Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala Glu 195 200 205

Trp Asp Arg Leu His Pro Val His Ala Gly Pro Ile Ala Pro Gly Gln 210 225 220

Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Asn Leu 225 230 235 240

Gln Glu Gln Ile Ala Trp Met Thr Ser Asn Pro Pro Val Pro Val Gly
245 250 255

Asp Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg 260 265 270

Met Tyr Ser Pro Thr Ser Ile Leu Asp Ile Lys Gln Gly Pro Lys Glu 275 280 285

Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala Glu 290 295 300

Gln Ala Thr Gln Asp Val Lys Asn Trp Met Thr Asp Thr Leu Leu Val 305 310 315 320

Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Arg Ala Leu Gly Pro 325 330 335

Gly Ala Ser Ile Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly Gly 340 345 350

Pro Ser His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Thr Asn 355 360 365

Ser Thr Ile Leu Met Gln Arg Ser Asn Phe Lys Gly Ser Lys Arg Ile 370 375 380

Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile Ala Arg Asn Cys 385 390 395 400

Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu Gly His
405 410 415

Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly Lys Ile 420 425 430

Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe Leu Gln Ser Arg Pro 435 440 445

Glu Pro Thr Ala Pro Pro Glu Glu Ser Phe Arg Phe Gly Glu Glu Thr

450 455 460

Thr Thr Pro Ser Gln Lys Gln Glu Pro Ile Asp Lys Glu Leu Tyr Pro 465 470 475 480

Leu Thr Ser Leu Lys Ser Leu Phe Gly Asn Asp Pro Ser Ser Gln
485 490 495

<210> 153 <211> 1488 <212> DNA <213> Human immunodeficiency virus

<400> 153

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<210> 154 <211> 491 <212> PRT

<213> Human immunodeficiency virus

<400> 154

Met Gly Ala Arg Ala Ser Ile Leu Arg Gly Gly Lys Leu Asp Lys Trp
1 5 10 15

Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys His Tyr Met Leu Lys
20 25 30

His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro 35 40 45

Gly	Leu 50	Leu	Glu	Thr	Ser	Glu 55	Gly	Cys	Lys	Gln	Ile 60	Ile	Lys	Gln	Leu
Gln 65	Pro	Ala	Leu	Gln	Thr 70	Gly	Thr	Glu	Glu	Leu 75	Arg	Ser	Leu	Phe	Asn 80
Thr	Val	Ala	Thr	Leu 85	Tyr	Cys	Val	His	Ala 90	Glu	Ile	Glu	Val	Arg 95	Asp
Thr	Lys	Glu	Ala 100	Leu	Asp	Lys	Ile	Glu 105	Glu	Glu	Gln	Asn	Lys 110	Ile	Gln
Gln	Lys	Thr 115	Gln	Gln	Ala	Lys	Glu 120	Ala	Asp	Glu	Lys	Val 125	Ser	Gln	Asn
Tyr	Pro 130	Ile	Val	Gln	Asn	Leu 135	Gln	Gly	Gln	Met	Val 140	His	Gln	Pro	Leu
Ser 145	Pro	Arg	Thr	Leu	Asn 150	Ala	Trp	Val	Lys	Val 155	Val	Glu	Glu	Lys	Ala 160
Phe	Ser	Pro	Glu	Val 165	Ile	Pro	Met	Phe	Thr 170	Ala	Leu	Ser	Glu	Gly 175	Ala
Thr	Pro	Gln	Asp 180	Leu	Asn	Thr	Met	Leu 185	Asn	Thr	Val	Gly	Gly 190	His	Gln
Ala	Ala	Met 195	Gln	Met	Leu	Lys	Asp 200	Thr	Ile	Asn	Glu	Glu 205	Ala	Ala	Glu
Trp	Asp 210	Arg	Leu	His	Pro	Val 215	His	Ala	Gly	Pro	Val 220	Ala	Pro	Gly	Gln
Met 225	Arg	Glu	Pro	Arg	Gly 230	Ser	Asp	Ile	Ala	Gly 235	Thr	Thr	Ser	Thr	Leu 240
Gln	Glu	Gln	Ile	Gly 245	Trp	Met	Thr	Asn	Asn 250	Pro	Pro	Ile	Pro	Val 255	Gly
Glu	Ile	Tyr	Lys 260	Arg	Trp	Ile	Ile	Leu 265	Gly	Leu	Asn	Lys	Ile 270	Val	Arg
Met	Tyr	Ser 275	Pro	Thr	Ser	Ile	Leu 280	Asp	Ile	Lys	Gln	Gly 285	Pro	Lys	Glu
Pro	Phe 290	Arg	Asp	Tyr	Val	Asp 295	Arg	Phe	Phe	Lys	Thr 300	Leu	Arg	Ala	Glu
Gln 305	Ala	Thr	Gln	Asp	Val 310	Lys	Asn	Trp	Met	Thr 315	Asp	Thr	Leu	Leu	Val 320
Gln	Asn	Ala	Asn	Pro 325	Asp	Cys	Lys	Thr	Ile 330	Leu	Arg	Ala	Leu	Gly 335	Pro
Gly	Ala	Ser	Leu 340	Glu	Glu	Met	Met	Thr 345	Ala	Cys	Gln	Gly	Val 350	Gly	Gly

Pro Ser His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Thr Asn 355 360 365

Asn Thr Ile Leu Met Gln Arg Ser Asn Phe Lys Gly Ser Lys Arg Ile 370 380

Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile Ala Lys Asn Cys 385 . 390 395 400

Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu Gly His
405
410
415

Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly Lys Ile 420 425 430

Trp Pro Ser His Lys Gly Arg Pro Gly Asn Phe Leu Gln Ser Arg Pro 435 440 445

Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Arg Phe Glu Glu Thr Thr 450 455 460

Pro Ala Pro Lys Gln Glu Pro Lys Asp Arg Glu Pro Leu Thr Ser Leu 465 470 475 480

Arg Ser Leu Phe Gly Ser Asp Pro Leu Ser Gln 485 490

<210> 155

<211> 1476

<212> DNA

<213> Human immunodeficiency virus

<400> 155

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<210> 156 <211> 499 <212> PRT <213> Human immunodeficiency virus <400> 156 Met Gly Ala Arg Ala Ser Val Leu Ser Gly Gly Lys Leu Asp Glu Trp Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Tyr Arg Leu Lys His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro Gly Leu Leu Glu Thr Ser Glu Gly Cys Lys Gln Ile Ile Gly Gln Leu Gln Pro Ala Ile Gln Thr Gly Ser Glu Glu Ile Lys Ser Leu Tyr Asn Thr Val Ala Thr Leu Tyr Cys Val His Glu Arg Ile Lys Val Thr Asp Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Glu Gln Thr Lys Ser Lys 100 105 Lys Lys Ala Gln Gln Ala Thr Ala Asp Thr Gly Asn Ser Ser Gln Val 120 Ser Gln Asn Tyr Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His 135 Gln Pro Leu Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Ile Glu 145 150 155 160 Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser 170 Glu Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His Gln Ala Ala Met Gln Met Leu Lys Glu Thr Ile Asn Glu Glu Ala Ala Glu Trp Asp Arg Leu His Pro Val Gln Ala Gly Pro Val Ala 215 Pro Gly Gln Ile Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr 225 230 235 240 Ser Thr Leu Gln Glu Gln Ile Arg Trp Met Thr Ser Asn Pro Pro Ile

250

Pro Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys 260 265 270

Ile Val Arg Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly
275 280 285

Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Tyr Lys Thr Leu 290 295 300

Arg Ala Glu Gln Ala Ser Gln Asp Val Lys Asn Trp Met Thr Glu Thr 305 310 315 320

Leu Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala 325 330 335

Leu Gly Pro Ala Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly
340 345 350

Val Gly Gly Pro Ser His Lys Ala Arg Val Leu Ala Glu Ala Met Ser 355 360 365

Gln Ala Thr Ser Gly Asn Ala Ile Met Met Gln Arg Gly Asn Phe Lys 370 375 380

Gly Pro Lys Lys Ile Ile Lys Cys Phe Asn Cys Gly Lys Glu Gly His 385 390 395 400

Ile Ala Lys Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys
405
410
415

Gly Arg Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn 420 425 430

Phe Leu Gly Lys Ile Trp Pro Ser Asn Lys Gly Arg Pro Gly Asn Phe 435 440 445

Leu Gln Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Gly 450 455 460

Phe Gly Glu Glu Ile Thr Pro Ser Gln Lys Gln Glu Gln Lys Asp Lys 465 470 475 480

Glu Leu His Pro Leu Ala Ser Leu Lys Ser Leu Phe Gly Asn Asp Pro 485 490 495

Leu Ser Gln

<210> 157

<211> 1500

<212> DNA

<213> Human immunodeficiency virus

<400> 157

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ctggagcgct tcgccctgaa ccccggcctg ctggagacct ccgagggctg caagcagatc 180
ateggecage tgeagecege categage ggeteegagg agateaagte cetgtacaac 240
acceptageca cectagtacta estacaaga escateaaga taaccaaca caagaagace 300
ctggacaaga tcgaggagga gcagaccaag tccaagaaga aggcccagca ggccaccgcc 360
gacaccggca actectecca ggtgteccag aactaceeca tegtgeagaa eetgeaggge 420
cagatggtgc accagecect gteeceeege accetgaacg eetgggtgaa ggtgategag 480
gagaaggcct tctcccccga ggtgatcccc atgttctccg ccctgtccga gggcgccacc 540
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ggccccgtgg cccccggcca gatccgcgag ccccgcggct ccgacatcgc cggcaccacc 720
tccaccctgc aggagcagat ccgctggatg acctccaacc cccccatccc cgtgggcgag 780
atctacaagc gctggatcat cctgggcctg aacaaqatcq tqcqcatqta ctcccccgtg 840
tecatectgg acatecgeca gggeeceaag gagecettee gegaetaegt ggaeegette 900
tacaagaccc tgcgcgccga gcaggcctcc caggacgtga agaactggat gaccgagacc 960
ctgctggtgc agaacgccaa ccccgactgc aagaccatcc tgaaggccct gggccccgcc 1020
gccaccctqq aggaqatqat qaccqcctqc caqqqcqtqq qcqqcccctc ccacaaggcc 1080
cgcgtgctgg ccgaggccat gtcccaggcc acctccggca acgccatcat gatgcagcgc 1140
ggcaacttca agggccccaa gaagatcatc aagtgcttca actgcggcaa ggagggccac 1200
ategecaaga actgeegege ceeeegeaag aagggetget ggaagtgegg cegegaggge 1260
caccagatga aggactgcac cgagcgccag gccaacttcc tgggcaagat ctggccctcc 1320
aacaagggcc gccccggcaa cttcctgcag tcccgccccg agcccaccgc ccccccgcc 1380
gagtccttcg gcttcggcga ggagatcacc ccctcccaga agcaggagca gaaggacaag 1440
gagetgeace ceetggeete cetgaagtee etgtteggea acgaeceeet gteecagtaa 1500
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<210> 158
<211> 497
<212> PRT
<213> Human immunodeficiency virus
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<400> 158

Met Gly Ala Arg Ala Ser Val Leu Ser Gly Gly Lys Leu Asp Ala Trp
1 5 10 15

Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Arg Leu Lys
20 25 30

His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro 35 40 45

Ser Leu Leu Glu Thr Ala Glu Gly Cys Gln Gln Ile Met Gly Gln Leu 50 55 60

Gln Pro Ala Leu Gly Thr Gly Thr Glu Glu Leu Arg Ser Leu Tyr Asn 65 70 75 80

Thr Val Ala Thr Leu Tyr Cys Val His His Arg Ile Glu Val Lys Asp 85 90 95

Thr Lys Glu Ala Leu Asp Lys Ile Glu Glu Ile Gln Asn Lys Ser Lys
100 105 110

Gln Lys Lys Gln Gln Ala Ala Ala Asp Thr Gly Asn Ser Ser Lys Val 115 120 125

Ser Gln Asn Tyr Pro Ile Val Gln Asn Ala Gln Gly Gln Met Val His

Gln Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val Glu 155 Glu Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser 170 Glu Gly Ala Thr Pro Gln Asp Leu Asn Met Met Leu Asn Ile Val Gly 185 Gly His Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu 200 Ala Ala Glu Trp Asp Arg Val His Pro Val His Ala Gly Pro Ile Pro 215 Pro Gly Gln Met Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr 235 230 Ser Thr Leu Gln Glu Gln Ile Gly Trp Met Thr Gly Asn Pro Pro Val Pro Val Gly Glu Ile Tyr Arg Arg Trp Ile Ile Leu Gly Leu Asn Lys 265 Ile Val Arg Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly Pro Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu 295 Arg Ala Glu Gln Ala Thr Gln Glu Val Lys Ser Trp Met Thr Glu Thr 315 320 305 Leu Leu Ile Gln Asn Ala Asn Pro Asp Cys Lys Ser Ile Leu Arg Ala 335 330 325 Leu Gly Pro Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly 345 Val Gly Gly Pro Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser 355 Gln Val Gln Gln Thr Asn Ile Met Met Gln Arg Ser Asn Phe Lys Gly Gln Lys Arg Ile Lys Cys Phe Asn Cys Gly Lys Glu Gly His Leu Ala 390 395 400 Arg Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys Glu Gly His Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu 425 Gly Lys Ile Trp Pro Ser Ser Lys Gly Arg Pro Gly Asn Phe Leu Gln

435 440 445 Ser Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Gly Phe Gly 450 455 Glu Glu Ile Ala Pro Ser Pro Lys Gln Glu Pro Lys Glu Lys Glu Leu 470 475 Tyr Pro Leu Thr Ser Leu Lys Ser Leu Phe Gly Ser Asp Pro Leu Ser 485 490 Gln <210> 159 <211> 1494 <212> DNA <213> Human immunodeficiency virus <400> 159 atgggegece gegeeteegt getgteegge ggeaagetgg acgeetggga gaagateege 60 ctgcgccccg gcggcaagaa gaagtaccgc ctgaagcacc tggtgtgggc ctcccgcqag 120 ctggagcgct tcgccctgaa cccctccctg ctggagaccg ccgagggctg ccagcagatc 180 atgggccage tgcagecege cetgggcace ggcaeegagg agetgegete cetgtacaae 240 accgtggcca ccctgtactg cgtgcaccac cgcatcgagg tgaaggacac caaggaggcc 300 ctggacaaga tcgaggagat ccagaacaag tccaagcaga agaagcagca ggccgccgcc 360 gacaccggca actcctccaa ggtgtcccag aactacccca tcgtgcagaa cgcccagggc 420 cagatggtgc accaggccat ctcccccgc accctgaacg cctgggtgaa ggtggtggag 480 qaqaaqqcct tctcccccqa gqtgatcccc atgttctccg ccctgtccga gggcgccacc 540 ccccaqqacc tqaacatqat gctgaacatc gtgggcggcc accaggccgc catgcagatg 600 ctqaaqqaca ccatcaacqa gqaqqccqcc gagtgggacc gcgtgcaccc cgtgcacgcc 660 ggccccatcc ccccggcca gatgcgcgag ccccgcggct ccgacatcgc cggcaccacc 720 tccaccctgc aggagcagat cggctggatg accggcaacc cccccgtgcc cgtgggcgag 780 atctaccgcc gctggatcat cctgggcctg aacaagatcg tgcgcatgta ctcccccgtg 840 tccatcctgg acatccgcca gggccccaag gagcccttcc gcgactacgt ggaccgcttc 900 ttcaagaccc tgcgcgccga gcaggccacc caggaggtga agtcctggat gaccgagacc 960 ctqctqatcc aqaacqccaa ccccqactgc aagtccatcc tgcgcgccct gggccccggc 1020 gccaccctgg aggagatgat gaccgcctgc cagggcgtgg gcggccccgg ccacaaggcc 1080 cgcgtgctgg ccgaggccat gtcccaggtg cagcagacca acatcatgat gcagcgctcc 1140 aacttcaagg gccagaagcg catcaagtgc ttcaactgcg gcaaggaggg ccacctggcc 1200 cgcaactgcc gcgcccccg caagaagggc tgctggaagt gcggcaagga gggccaccag 1260 atgaaggact gcaccgagcg ccaggccaac ttcctgggca agatctggcc ctcctccaag 1320 ggccgccccg gcaacttcct gcagtcccgc cccgagccca ccgcccccc cgccgagtcc 1380 ttcggcttcg gcgaggagat cgcccctcc cccaagcagg agcccaagga gaaggagctg 1440 tacccctga cctccctgaa gtccctgttc ggctccgacc ccctgtccca gtaa

<210> 160 <211> 492 <212> PRT

<213> Human immunodeficiency virus

<400> 160
Met Gly Ala Arg Ala Ser Val Leu Ser Gly Gly Glu Leu Asp Arg Trp
1 5 10 15

- Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Lys Tyr Arg Leu Lys
 20 25 30
- His Ile Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Val Asn Pro 35 40 45
- Gly Leu Leu Glu Thr Ser Glu Gly Cys Arg Lys Ile Ile Gly Gln Leu
 50 55 60
- Gln Pro Ser Leu Gln Thr Gly Ser Glu Glu Leu Arg Ser Leu Tyr Asn 65 70 75 80
- Thr Ile Ala Val Leu Tyr Phe Val His Gln Lys Val Glu Val Lys Asp
 85 90 95
- Thr Lys Glu Ala Leu Asp Lys Leu Glu Glu Glu Gln Asn Lys Ser Gln
 100 105 110
- Gln Lys Thr Gln Gln Ala Ala Ala Asp Lys Gly Val Ser Gln Asn Tyr 115 120 125
- Pro Ile Val Gln Asn Leu Gln Gly Gln Met Val His Gln Ala Leu Ser 130 135 140
- Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val Glu Glu Lys Ala Phe 145 150 155 160
- Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser Glu Gly Ala Thr 165 170 175
- Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly His Gln Ala 180 185 190
- Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala Ala Glu Trp
- Asp Arg Leu His Pro Val His Ala Gly Pro Ile Pro Pro Gly Gln Met 210 215 220
- Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser Thr Leu Gln 225 230 235 240
- Glu Gln Ile Gln Trp Met Thr Ser Asn Pro Pro Val Pro Val Gly Glu 245 250 255
- Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met 260 265 270
- Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly Pro Lys Glu Pro 275 280 285
- Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg Ala Glu Gln 290 295 300
- Ala Thr Gln Glu Val Lys Gly Trp Met Thr Asp Thr Leu Leu Val Gln 305 310 315 320

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Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Lys Ala Leu Gly Pro Gly
                                    330
                325
Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly Pro
                                345
Gly His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Val Thr Asn
        355
                            360
Thr Thr Val Met Met Gln Lys Ser Asn Phe Lys Gly Gln Arg Arg Ile
                        375
Val Lys Cys Phe Asn Cys Gly Lys Glu Gly His Ile Ala Lys Asn Cys
                                        395
Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Arg Glu Gly His
Gln Met Lys Asp Cys Thr Glu Arg Gln Ala Asn Phe Leu Gly Lys Ile
                                425
Trp Pro Ser Asn Lys Gly Arg Pro Gly Asn Phe Leu Gln Asn Arg Pro
                            440
                                                445
Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Gly Phe Gly Glu Glu Ile
                        455
    450
Thr Pro Ser Pro Lys Gln Glu Gln Lys Asp Glu Gly Leu Tyr Pro Pro
                    470
                                        475
Leu Ala Ser Leu Lys Ser Leu Phe Gly Asn Asp Pro
                                    490
                485
<210> 161
<211> 1479
<212> DNA
<213> Human immunodeficiency virus
<400> 161
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ctggagcgct tcgccgtgaa ccccggcctg ctggagacct ccgagggctg ccgcaagatc 180
ateggecage tgeagecete cetgeagace ggeteegagg agetgegete cetgtacaac 240
accategeeq tgetgtaett egtgcaecag aaggtggagg tgaaggaeac caaggaggee 300
ctggacaagc tggaggagga gcagaacaag tcccagcaga agacccagca ggccgccgcc 360
qacaaqqqcq tqtcccaqaa ctaccccatc gtgcagaacc tgcagggcca gatggtgcac 420
caggecetgt ecceeggac cetgaacgee tgggtgaagg tggtggagga gaaggeette 480
tcccccgagg tgatccccat gttctccgcc ctgtccgagg gcgccacccc ccaggacctg 540
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aacaccatgc tgaacaccgt gggcggccac caggccgca tgcagatgct gaaggacacc 600 atcaacgagg aggccgcca gtgggaccgc ctgcaccccg tgcacgccgg ccccatcccc 660 cccggccaga tgcgcgagcc ccgcggctcc gacatcgccg gcaccacctc caccctgcag 720 gagcagatcc agtggatgac ctccaacccc cccgtgcccg tgggcgagat ctacaaggcc 780 tggatcatcc tgggcctgaa caagatcgtg cgcatgtact cccccgtgtc catcctggac 840 atccgccagg gccccaagga gcccttccgc gactacgtgg accgcttctt caagaccctg 900 cgcgccgagc aggccacca ggaggtgaag ggctggatga ccgacaccct gctggtgcag 960 aacgccaacc ccgactgcaa gaccatcctg aaggccctgg gccccggcgc caccctggag 1020

gagatgatga ccgcctgcca gggcgtgggc ggccccggcc acaaggcccg cgtgctggcc 1080 gaggccatgt cccaggtgac caacaccacc gtgatgatgc agaagtccaa cttcaagggc 1140 cagcgccgca tcgtgaagtg cttcaactgc ggcaaggagg gccacatcgc caagaactgc 1200 cgcgcccccc gcaagaaggg ctgctggaag tgcggccgcg agggccacca gatgaaggac 1260 tgcaccgagc gccaggccaa cttcctgggc aagatctggc cctccaacaa gggccgcccc 1320 ggcaacttcc tgcagaaccg ccccgagccc accgccccc ccgccgagtc cttcggcttc 1380 ggcgaggaga tcacccctc ccccaagcag gagcagaagg acgagggcct gtacccccc 1440 ctggcctccc tgaagtccct gttcggcaac gacccctaa <210> 162 <211> 496 <212> PRT <213> Human immunodeficiency virus <400> 162 Met Gly Ala Arg Ala Ser Val Leu Ser Gly Gly Lys Leu Asp Ala Trp 1.0 Glu Lys Ile Arg Leu Arg Pro Gly Gly Lys Lys Tyr Arg Met Lys 25 His Leu Val Trp Ala Ser Arg Glu Leu Glu Arg Phe Ala Leu Asn Pro 40 Asp Leu Leu Glu Thr Ala Glu Gly Cys Gln Gln Ile Met Gly Gln Leu Gln Pro Ala Leu Gln Thr Gly Thr Glu Glu Ile Arg Ser Leu Phe Asn Thr Val Ala Thr Leu Tyr Cys Val His Gln Lys Ile Glu Val Lys Asp Thr Lys Glu Ala Leu Glu Glu Val Glu Lys Ala Gln Lys Lys Ser Gln 105 Lys Lys Gln Gln Ala Ala Met Asp Glu Gly Asn Asn Ser Gln Ala Ser 120 125 115 Gln Asn Tyr Pro Ile Val Gln Asn Ala Gln Gly Gln Met Val His Gln 135 Ala Ile Ser Pro Arg Thr Leu Asn Ala Trp Val Lys Val Val Glu Glu 155 145 150 160 Lys Ala Phe Ser Pro Glu Val Ile Pro Met Phe Ser Ala Leu Ser Glu 165 170 Gly Ala Thr Pro Gln Asp Leu Asn Thr Met Leu Asn Thr Val Gly Gly 185 His Gln Ala Ala Met Gln Met Leu Lys Asp Thr Ile Asn Glu Glu Ala

200

215

Ala Glu Trp Asp Arg Met His Pro Gln Gln Ala Gly Pro Ile Pro Pro

195

210

205

Gly Gln Ile Arg Glu Pro Arg Gly Ser Asp Ile Ala Gly Thr Thr Ser 235 Thr Leu Gln Glu Gln Ile Arg Trp Met Thr Ser Asn Pro Pro Ile Pro 250 Val Gly Glu Ile Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile 265 Val Arg Met Tyr Ser Pro Val Ser Ile Leu Asp Ile Arg Gln Gly Pro 280 Lys Glu Pro Phe Arg Asp Tyr Val Asp Arg Phe Phe Lys Thr Leu Arg 290 295 Ala Glu Gln Ala Thr Gln Glu Val Lys Gly Trp Met Thr Asp Thr Leu 310 315 Leu Val Gln Asn Ala Asn Pro Asp Cys Lys Thr Ile Leu Arg Ala Leu Gly Pro Gly Ala Thr Leu Glu Glu Met Met Thr Ala Cys Gln Gly Val Gly Gly Pro Ser His Lys Ala Arg Val Leu Ala Glu Ala Met Ser Gln Ala Ser Gly Ala Thr Ile Met Met Gln Lys Ser Asn Phe Lys Gly Pro Arg Arg Asn Ile Lys Cys Phe Asn Cys Gly Lys Glu Gly His Leu Ala 390 395 Arg Asn Cys Arg Ala Pro Arg Lys Lys Gly Cys Trp Lys Cys Gly Lys 410 Glu Gly His Gln Met Lys Asp Cys Thr Glu Ser Lys Ala Asn Phe Leu 425 420 Gly Lys Ile Trp Pro Ser Asn Lys Gly Arg Pro Gly Asn Phe Leu Gln Asn Arg Pro Glu Pro Thr Ala Pro Pro Ala Glu Ser Phe Gly Phe Gly 450 455 Glu Glu Ile Ala Pro Ser Pro Lys Gln Glu Pro Lys Glu Lys Glu Ile 465 Tyr Pro Leu Ala Ser Leu Lys Ser Leu Phe Gly Ser Asp Pro Ser Gln

<210> 163

<211> 1494

<212> DNA

<213> Human immunodeficiency virus

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<400> 163
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ctgcgccccg gcggcaagaa gaagtaccgc atgaagcacc tggtgtgggc ctcccgcgag 120
ctggagcgct tcgccctgaa ccccgacctg ctggagaccg ccgagggctg ccagcagatc 180
atgggccagc tgcagcccgc cctgcagacc ggcaccgagg agatccgctc cctgttcaac 240
acceptagcca coctetacte cetteccae aagatcegage teaaggacac caaggagec 300
ctggaggagg tggagaaggc ccagaagaag tcccagaaga agcagcaggc cgccatggac 360
qaqqqcaaca actcccaggc ctcccagaac taccccatcg tgcagaacgc ccagggccag 420
atggtgcacc aggccatctc ccccgcacc ctgaacgcct gggtgaaggt ggtggaggag 480
aaqqccttct ccccqaggt qatccccatg ttctccgccc tgtccgaggg cgccaccccc 540
caqqacctqa acaccatgct qaacaccgtg ggcggccacc aggccgccat gcagatgctg 600
aaggacacca tcaacgagga ggccgccgag tgggaccgca tgcaccccca gcaggccggc 660
cccatcccc ccggccagat ccgcgagccc cgcggctccg acatcgccgg caccacctcc 720
accetgeagg ageagateeg etggatgace tecaaceece ceateceegt gggegagate 780
tacaagcgct ggatcatcct gggcctgaac aagatcgtgc gcatgtactc ccccgtgtcc 840
atcctggaca tccgccaggg ccccaaggag cccttccgcg actacgtgga ccgcttcttc 900
aagaccctgc gcgccgagca ggccacccag gaggtgaagg gctggatgac cgacaccctg 960
ctggtgcaga acgccaaccc cgactgcaag accatcctgc gcgccctggg ccccggcgcc 1020
accetggagg agatgatgae egeetgeeag ggegtgggeg geeceteeca caaggeeege 1080
gtgctggccg aggccatgtc ccaggcctcc ggcgccacca tcatgatgca gaagtccaac 1140
ttcaagggcc cccgccgcaa catcaagtgc ttcaactgcg gcaaggaggg ccacctggcc 1200
cgcaactgcc gcgcccccg caagaagggc tgctggaagt gcggcaagga gggccaccag 1260
atgaaqqact gcaccgagtc caaggccaac ttcctgggca agatctggcc ctccaacaag 1320
ggccgccccg gcaacttcct gcagaaccgc cccgagccca ccgcccccc cgccgagtcc 1380
ttcqqcttcq qcqaqqaqat cqcccctcc cccaagcagg agcccaagga gaaggagatc 1440
taccccctgg cctccctgaa gtccctgttc ggctccgacc cctaatccca gtaa
<210> 164
<211> 206
<212> PRT
<213> Human immunodeficiency virus
<400> 164
Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Ala Val
Arg Glu Arg Ile Arg Arg Thr Pro Pro Ala Ala Glu Gly Val Gly Ala
Val Ser Gln Asp Leu Asp Lys His Gly Ala Ile Thr Ser Ser Asn Thr
                                                 45
         35
Ala Ala Thr Asn Ala Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu
Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr
                     70
                                         75
Tyr Lys Gly Ala Phe Asp Leu Ser His Phe Leu Lys Glu Lys Gly Gly
                                     90
                                                         95
                 85
Leu Asp Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp Leu
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Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr Thr

115 120 125

Pro Gly Pro Gly Ile Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe Lys 130 135 140

Leu Val Pro Val Asp Pro Glu Glu Val Glu Glu Ala Asn Glu Glu 145 150 155 160

Asn Asn Cys Leu Leu His Pro Met Cys Gln His Gly Met Glu Asp Glu 165 170 175

Asp Arg Glu Val Leu Met Trp Lys Phe Asp Ser Arg Leu Ala Leu Arg 180 185 190

His Ile Ala Arg Glu Leu His Pro Glu Phe Tyr Lys Asp Cys 195 200 205

<210> 165

<211> 621

<212> DNA

<213> Human immunodeficiency virus

<400> 165

atgggcggca agtggtcaa gtcctcatc gtgggctgg ccgccgtgg cgagcgcatc 60 cgccgcaccc ccccgcgc cgagggcgtg ggcgccgtgt cccaggacct ggacaagcac 120 ggcgccatca cctcctcaa caccgccgc accaacgccg actgcgcctg gctggaggcc 180 caggaggggg aggaggtggg cttccccgtg cgccccaagg tgcccctgcg ccccatgacc 240 tacaagggcg ccttcgacct gtcccacttc ctgaaggaga agggcggct ggacggcctg 300 atctactcca agaaggcca ggagatcctg gacctgtggg tgtaccacac ccagggctac 360 ttccccgact ggcagaacta cacccccggc cccggcatcc gctacccct gaccttcggc 420 tggtgcttca agctggtgcc cgtggacccc gaggaggtgg aggaggccaa cgagggcgag 480 aacaactgcc tgctgcaccc catgtgccag cacggcatcg aggacgagga ccgcgaggtg 540 ctgatgtgga agttcgacc ccgcctggcc ctgcgccaca tcgcccgga gctgcaccc 600 gagttctaca aggactgcta a

<210> 166

<211> 206

<212> PRT

<213> Human immunodeficiency virus

<400> 166

Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Ala Val 1 5 10 15

Arg Glu Arg Met Arg Arg Thr Ala Pro Ala Ala Glu Gly Val Gly Ala
20 25 30

Val Ser Gln Asp Leu Asp Lys His Gly Ala Ile Thr Ser Ser Asn Thr
35 40 45

Ala Ala Thr Asn Ala Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu 50 55 60

Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr 65 70 75 80

```
Tyr Lys Ala Ala Phe Asp Leu Ser His Phe Leu Lys Glu Lys Gly Gly
Leu Asp Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp Leu
                                                    110
                                105
Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr Thr
        115
                            120
Pro Gly Pro Gly Ile Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe Lys
                                            140
                        135
Leu Val Pro Val Asp Pro Glu Glu Val Glu Glu Ala Asn Glu Gly Glu
                                                             160
                                        155
145
                    150
Asn Asn Cys Leu Leu His Pro Met Cys Gln His Gly Met Glu Asp Glu
                165
                                    170
Glu Arg Glu Val Leu Met Trp Lys Phe Asp Ser Arg Leu Ala Leu Arg
                                185
His Ile Ala Arg Glu Leu His Pro Glu Phe Tyr Lys Asp Cys
                            200
        195
<210> 167
<211> 621
<212> DNA
<213> Human immunodeficiency virus
<400> 167
atgggcggca agtggtccaa gtcctccatc gtgggctggc ccgccgtgcg cgagcgcatg 60
cgccgcaccg ccccgccgc cgagggcgtg ggcgccgtgt cccaggacct ggacaagcac 120
ggcgccatca cctcctccaa caccgccgcc accaacgccg actgcgcctg gctggaggcc 180
caggaggagg aggaggtggg cttccccgtg cgcccccagg tgcccctgcg ccccatgacc 240
tacaaggccq ccttcqacct gtcccacttc ctgaaggaga agggcggcct ggacggcctg 300
atctactcca agaagcgcca ggagatcctg gacctgtggg tgtaccacac ccagggctac 360
ttccccgact ggcagaacta caccccggc cccggcatcc gctaccccct gaccttcggc 420
tggtgcttca agctggtgcc cgtggacccc gaggaggtgg aggaggccaa cgagggcgag 480
aacaactgcc tgctgcaccc catgtgccag cacggcatgg aggacgagga gcgcgaggtg 540
ctgatgtgga agttcgactc ccgcctggcc ctgcgccaca tcgcccgcga gctgcacccc 600
gagttctaca aggactgcta a
                                                                   621
<210> 168
<211> 207
<212> PRT
<213> Human immunodeficiency virus
<400> 168
Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Asp Ile
                                     10
Arg Glu Arg Ile Arg Arg Thr Pro Pro Ala Ala Lys Gly Val Gly Ala
                                                      30
                                 25
             20
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Val Ser Gln Asp Leu Asp Lys Tyr Gly Ala Val Thr Ile Asn Asn Thr
         35
                             40
Ala Ala Thr Gln Ala Ser Cys Ala Trp Leu Glu Ala Gln Glu Glu Glu
Glu Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met
                     70
                                         75
Thr Phe Lys Gly Ala Phe Asp Leu Ser Phe Phe Leu Lys Glu Lys Gly
                 85
                                     90
Gly Leu Asp Gly Leu Ile Tyr Ser Gln Lys Arg Gln Glu Ile Leu Asp
                                105
Leu Trp Val Tyr Asn Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr
        115
Thr Pro Gly Pro Gly Thr Arg Phe Pro Leu Thr Phe Gly Trp Cys Phe
                        135
Lys Leu Val Pro Val Asp Pro Asp Glu Val Glu Glu Ala Thr Glu Gly
                                        155
Glu Asn Asn Cys Leu Leu His Pro Ile Cys Gln His Gly Met Asp Asp
                165
                                    170
Glu Glu Lys Glu Val Leu Met Trp Lys Phe Asp Ser Arg Leu Ala Arg
                                185
Arg His Ile Ala Leu Glu Met His Pro Glu Phe Tyr Lys Asp Cys
                            200
                                                205
<210> 169
<211> 624
<212> DNA
<213> Human immunodeficiency virus
<400> 169
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egeegeacee ecceegeege caagggegtg ggegeegtgt eccaggaeet ggacaagtae 120
ggcgccgtga ccatcaacaa caccgccgcc acccaggcct cctgcqcctg gctggaggcc 180
caggaggagg aggaggaggt gggcttcccc gtgcgccccc aggtgcccct gcgccccatg 240
accttcaagg gegeettega cetgteette tteetgaagg agaagggegg cetggaegge 300
ctgatctact cccagaagcg ccaggagatc ctggacctgt gggtgtacaa cacccagggc 360
tacttccccg actggcagaa ctacaccccc ggccccggca cccgcttccc cctgaccttc 420
ggctggtgct tcaagctggt gcccgtggac cccgacgagg tggaggaggc caccgagggc 480
gagaacaact gcctgctgca ccccatctgc cagcacggca tggacgacga ggagaaggag 540
gtgctqatgt ggaagttcga ctcccgcctg gcccgccgcc acatcgccct ggagatgcac 600
cccgagttct acaaggactg ctaa
                                                                   624
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<210> 170

<211> 204

<212> PRT

<213> Human immunodeficiency virus

<400> 170

Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Glu Val
1 5 10 15

Arg Glu Arg Met Arg Arg Thr Pro Pro Ala Ala Thr Gly Val Gly Ala
20 25 30

Val Ser Gln Asp Leu Asp Lys His Gly Ala Val Thr Ser Ser Asn Ile 35 40 45

Asn His Pro Ser Cys Val Trp Leu Glu Ala Gln Glu Glu Glu Val
50 55 60

Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr Tyr Lys
65 70 75 80

Gly Ala Leu Asp Leu Ser His Phe Leu Lys Glu Lys Gly Gly Leu Asp 85 90 95

Gly Leu Ile Tyr Ser Arg Lys Arg Gln Glu Ile Leu Asp Leu Trp Val

Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr Thr Pro Gly
115 120 125

Pro Gly Ile Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe Lys Leu Val

Pro Val Asp Pro Asp Glu Val Glu Lys Ala Thr Glu Gly Glu Asn Asn 145 150 155 160

Ser Leu Leu His Pro Ile Cys Gln His Gly Met Asp Asp Glu Glu Arg 165 170 175

Glu Val Leu Lys Trp Lys Phe Asp Ser Arg Leu Ala Leu Lys His Arg 180 185 190

Ala Gln Glu Leu His Pro Glu Phe Tyr Lys Asp Cys
195 200

<210> 171

<211> 615

<212> DNA

<213> Human immunodeficiency virus

<400> 171

atgggcggca agtggtcaa gtcctcatc gtggctggc ccgaggtgc cgagcgcatg 60 cgccgcaccc cccccgccgc caccggcgtg ggcgccgtgt cccaggacct ggacaagcac 120 ggcgccgtga cctcctcaa catcaaccac ccctcctgcg tgtggctgga ggcccaggag 180 gaggaggagg tgggcttccc cgtgcgccc caggtgccc tgcgcccat gacctacaag 240 ggcgccctgg acctgtcca cttcctgaag gagaagggcg gcctggacgg cctgatctac 300 tcccgcaage gccaggagat cctggacctg tgggtgtacc acacccaggg ctacttccc 360 gactggcaga actacaccc cggccccggc atccgctacc ccctgacctt cggctggtg 420 ttcaagctgg tgcccgtgga ccccgacgag gtggagaagg ccaccgaggg cgagaacaac 480 tccctgctgc accccatctg ccagcacgg atggacgac aggagcgca ggtgctgaag 540

<210> 172

<211> 206

<212> PRT

<213> Human immunodeficiency virus

<400> 172

Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Glu Val
1 5 10 15

Arg Glu Arg Met Arg Arg Thr Pro Pro Ala Ala Lys Gly Val Gly Ala
20 25 30

Val Ser Gln Asp Leu Asp Lys His Gly Ala Val Thr Ser Ser Asn Thr 35 40 45

Ala Ala Asn Asn Pro Gly Cys Ala Trp Leu Glu Ala Gln Glu Glu 50 55 60

Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr
65 70 75 80

Tyr Lys Gly Ala Phe Asp Leu Ser His Phe Leu Lys Glu Lys Gly Gly 85 90 95

Leu Asp Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp Leu 100 105 110

Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr Thr

Pro Gly Pro Gly Ile Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe Lys
130 135 140

Leu Val Pro Val Asp Pro Ala Glu Val Glu Glu Ala Thr Glu Gly Glu 145 150 155 160

Asn Asn Ser Leu Leu His Pro Ile Cys Gln His Gly Met Asp Asp Glu 165 170 175

Glu Arg Glu Val Leu Met Trp Lys Phe Asp Ser Arg Leu Ala Leu Lys 180 185 190

His Arg Ala Arg Glu Leu His Pro Glu Phe Tyr Lys Asp Cys 195 200 205

<210> 173

<211> 621

<212> DNA

<213> Human immunodeficiency virus

<400> 173

atgggcggca agtggtccaa gtcctccatc gtgggctggc ccgaggtgcg cgagcgcatg 60

cgccgcaccc ccccgccgc caagggcgtg ggcgccgtgt cccaggacct ggacaagcac 120 ggcgccgtga cctcctccaa caccgccgcc aacaaccccg gctgcgcctg gctggaggcc 180 caggaggagg aggaggtggg cttccccgtg cgcccccagg tgccccttgcg ccccatgacc 240 tacaagggcg ccttcgacct gtcccacttc ctgaaggaga agggcggcct ggacggcctg 300 atctactcca agaagcgca ggagatcctg gacctgtggg tgtaccacac ccagggctac 360 ttccccgact ggcagaacta cacccccggc cccggcatcc gctacccct gaccttcggc 420 tggtgcttca agctggtgcc cgtggacccc gccgaggtgg aggaggccac cgagggcgag 480 aacaactccc tgctgcaccc catctgccag cacggcatgg acgacgagga gcgcgaggtg 540 ctgatgtga agttcgactc ccgcctggcc ctgaagcacc gcgcccgca gctgcaccc 600 gagttctaca aggactgcta a

<210> 174

<211> 207

<212> PRT

<213> Human immunodeficiency virus

<400> 174

Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Ala Ile
1 5 10 15

Arg Glu Arg Met Arg Lys Arg Thr Pro Pro Ala Ala Glu Gly Val Gly
20 25 30

Ala Val Ser Gln Asp Leu Ala Thr Arg Gly Ala Val Thr Ser Ser Asn 35 40 45

Thr Ala Ala Thr Asn Pro Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu 50 55 60

Glu Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met
65 70 75 80

Thr Phe Lys Gly Ala Phe Asp Leu Ser His Phe Leu Lys Glu Lys Gly
85 90 95

Gly Leu Asp Gly Leu Ile Tyr Ser Gln Lys Arg Gln Asp Ile Leu Asp 100 105 110

Leu Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr 115 120 125

Thr Pro Gly Pro Gly Thr Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe 130 135 140

Lys Leu Val Pro Val Asp Pro Ser Glu Val Glu Glu Ala Thr Glu Gly
145 150 155 160

Glu Asn Asn Ser Leu Leu His Pro Ile Cys Gln His Gly Ile Glu Asp 165 170 175

Pro Glu Arg Glu Val Leu Arg Trp Lys Phe Asp Ser Arg Leu Ala Leu 180 185 190

Arg His Arg Ala Arg Glu Leu His Pro Glu Phe Tyr Lys Asp Cys
195 200 205

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<210> 175
<211> 624
<212> DNA
<213> Human immunodeficiency virus
<400> 175
atgggcggca agtggtccaa gtcctccatc gtgggctggc ccgccatccg cgagcgcatg 60
cgcaagcgca cccccccgc cgccgagggc gtgggcgccg tgtcccagga cctggccacc 120
cgcggcgccg tgacctcctc caacaccgcc gccaccaacc ccgactgcgc ctggctggag 180
gcccaggagg aggaggaggt gggcttcccc gtgcgccccc aggtgcccct gcgccccatg 240
accttcaagg gcgccttcga cctgtcccac ttcctgaagg agaagggcgg cctggacggc 300
ctgatctact cccagaageg ccaggacatc ctggacctgt gggtgtacca cacccagggc 360
tacttccccg actggcagaa ctacaccccc ggccccggca cccgctaccc cctgaccttc 420
ggctggtgct tcaagctggt gcccgtggac ccctccgagg tggaggaggc caccgagggc 480
qaqaacaact ccctgctgca ccccatctgc cagcacggca tcgaggaccc cgagcgcgag 540
qtqctqcqct qqaaqttcqa ctcccgcctg gccctgcgcc accgcgcccg cgagctgcac 600
cccgagttct acaaggactg ctaa
<210> 176
<211> 206
<212> PRT
<213> Human immunodeficiency virus
<400> 176
Met Gly Gly Lys Trp Ser Lys Arg Ser Val Val Gly Trp Pro Thr Val
Arg Glu Arg Met Arg Arg Ala Glu Pro Ala Ala Asp Gly Val Gly Ala
Val Ser Arg Asp Leu Glu Lys His Gly Ala Ile Thr Ser Ser Asn Thr
                             40
                                                  45
Ala Ala Asn Asn Ala Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu Glu
Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr
                     70
                                         75
Tyr Lys Gly Ala Leu Asp Leu Ser His Phe Leu Lys Glu Lys Gly Gly
                 85
Leu Glu Gly Leu Ile Tyr Ser Gln Lys Arg Gln Asp Ile Leu Asp Leu
                                105
            100
Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr Thr
        115
                            120
Pro Gly Pro Gly Ile Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe Lys
    130
                        135
Leu Val Pro Val Glu Pro Glu Lys Val Glu Glu Ala Asn Glu Gly Glu
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Asn Asn Ser Leu Leu His Pro Met Ser Leu His Gly Met Asp Asp Pro

165 170 175

Glu Arg Glu Val Leu Val Trp Lys Phe Asp Ser Arg Leu Ala Phe His 180 185 190

His Met Ala Arg Glu Leu His Pro Glu Tyr Tyr Lys Asp Cys 195 200 205

<210> 177

<211> 621

<212> DNA

<213> Human immunodeficiency virus

<400> 177

atgggeggea agtggteeaa gegeteegtg gtgggetgge ceaecgtgeg egagegeatg 60 cgeeggegeg ageeegege egacggegtg ggegeegtgt eeeggaeet ggagaageae 120 ggegeeatea eeteeteeaa eaeegeege aacaaegeeg actgegeetg getggaggee 180 caggaggggg aggaggtggg etteeegtg egeeeeagg tgeeeetgeg eeecatgaee 240 tacaagggeg eeetggaeet gteeeaette etgaaggaa agggeggeet ggagggeetg 300 atetaeteee agaagegea ggacateetg gacetgtggg tgtaceaeae eeagggetae 360 tteeeegaet ggeagaaeta eaeeeeegge eeeggeatee getaeeeee gacetteegge 420 tggtgettea agetggtgee egtggageee gagaaggtgg aggaggeeaa egagggegag 480 aacaaeteee tgetgaeee eatgteeetg eaeggeatgg aegaeeeega getgeaeee 600 gagtaetaea aggaetgeta a

<210> 178

<211> 206

<212> PRT

<213> Human immunodeficiency virus

<400> 178

Met Gly Gly Lys Trp Ser Lys Ser Ser Met Gly Gly Trp Pro Ala Val 1 5 10 15

Arg Glu Arg Met Lys Arg Ala Glu Pro Ala Ala Asp Gly Val Gly Ala 20 25 30

Val Ser Arg Asp Leu Glu Lys His Gly Ala Ile Thr Ser Ser Asn Thr
35 40 45

Ala Ala Thr Asn Ala Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu 50 55 60

Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr
65 70 75 80

Tyr Lys Ala Ala Leu Asp Leu Ser His Phe Leu Lys Glu Lys Gly Gly 85 90 95

Leu Glu Gly Leu Ile Tyr Ser Gln Lys Arg Gln Asp Ile Leu Asp Leu 100 105 110

Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr Thr 115 120 125

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Pro Gly Pro Gly Ile Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe Lys
                        135
Leu Val Pro Val Glu Pro Glu Lys Val Glu Glu Ala Thr Glu Gly Glu
145
                    150
                                        155
                                                             160
Asn Asn Ser Leu Leu His Pro Met Cys Gln His Gly Met Asp Asp Pro
                                    170
                165
Glu Lys Glu Val Leu Val Trp Lys Phe Asp Ser Arg Leu Ala Phe His
                                185
His Met Ala Arg Glu Leu His Pro Glu Tyr Tyr Lys Asp Cys
                            200
<210> 179
<211> 621
<212> DNA
<213> Human immunodeficiency virus
<400> 179
atgggcggca agtggtccaa gtcctccatg ggcggctggc ccgccgtgcg cgagcgcatg 60
aagcgcgccg agcccgccgc cgacggcgtg ggcgccgtgt cccgcgacct ggagaagcac 120
ggegecatea cetectecaa cacegeegee accaaegeeg aetgegeetg getggaggee 180
caggaggagg aggaggtggg cttccccgtg cgccccagg tgcccctgcg ccccatgacc 240
tacaaggccg ccctggacct gtcccacttc ctgaaggaga agggcggcct ggagggcctg 300
atctactccc agaagcgcca ggacatcctg gacctgtggg tgtaccacac ccagggctac 360
ttccccqact qqcaqaacta caccccqqc cccqqcatcc qctaccccct qaccttcqqc 420
tggtgcttca agctggtgcc cgtggagccc gagaaggtgg aggaggccac cgagggcgag 480
aacaactccc tgctgcaccc catgtgccag cacggcatgg acgaccccga gaaggaggtg 540
ctggtgtgga agttcgactc ccgcctggcc ttccaccaca tggcccgcga gctgcacccc 600
gagtactaca aggactgcta a
                                                                   621
<210> 180
<211> 206
<212> PRT
<213> Human immunodeficiency virus
<400> 180
Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Lys Val
Arg Glu Arg Ile Arg Gln Thr Pro Pro Ala Ala Thr Gly Val Gly Ala
             20
                                 25
                                                     30
Ala Ser Gln Asp Leu Asp Arg His Gly Ala Ile Thr Ser Ser Asn Thr
         35
                             40
Ala Ala Thr Asn Ala Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu Glu
                         55
Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr
 65
                     70
```

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Tyr Lys Ala Ala Val Asp Leu Ser His Phe Leu Lys Glu Lys Gly Gly
                 85
                                     90
Leu Glu Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp Leu
                                105
Trp Val Tyr His Thr Gln Gly Phe Phe Pro Asp Trp Gln Asn Tyr Thr
        115
                            120
Pro Gly Pro Gly Thr Arg Phe Pro Leu Thr Phe Gly Trp Cys Phe Lys
                        135
    130
Leu Val Pro Met Asp Pro Ala Glu Val Glu Glu Ala Asn Glu Gly Glu
                    150
                                        155
Asn Asn Ser Leu Leu His Pro Ile Cys Gln His Gly Met Glu Asp Glu
                165
Asp Arg Glu Val Leu Val Trp Arg Phe Asp Ser Ser Leu Ala Phe Lys
                                185
His Arg Ala Arg Glu Leu His Pro Glu Phe Tyr Lys Asp Cys
                            200
<210> 181
<211> 621
<212> DNA
<213> Human immunodeficiency virus
<400> 181
atgggcggca agtggtccaa gtcctccatc gtgggctggc ccaaggtgcg cgagcgcatc 60
cgccaqaccc ccccqccgc caccggcgtg ggcgccgcct cccaggacct ggaccgccac 120
ggcgccatca cctcctccaa caccgccgcc accaacgccg actgcgcctg gctggaggcc 180
caggaggagg aggaggtggg cttccccgtg cgcccccagg tgcccctgcg ccccatgacc 240
tacaaggccg ccgtggacct gtcccacttc ctgaaggaga agggcggcct ggagggcctg 300
atctactcca agaagcgcca ggagatcctg gacctgtggg tgtaccacac ccagggcttc 360
ttccccgact ggcagaacta caccccggc cccggcaccc gcttccccct gaccttcggc 420
tggtgcttca agctggtgcc catggacccc gccgaggtgg aggaggccaa cgagggcgag 480
aacaactccc tgctgcaccc catctgccag cacggcatgg aggacgagga ccgcgaggtg 540
ctggtgtggc gcttcgactc ctccctggcc ttcaagcacc gcgcccgcga gctgcacccc 600
gagttctaca aggactgcta a
<210> 182
<211> 207
<212> PRT
<213> Human immunodeficiency virus
<400> 182
Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Ala Val
  1
Arg Glu Arg Ile Arg Arg Thr Glu Pro Ala Ala Glu Gly Val Gly Ala
Ala Ser Gln Asp Leu Asp Lys His Gly Ala Leu Thr Ser Ser Asn Thr
```

35 40 45

Ala Thr Asn Asn Ala Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu 50 55 60

Glu Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met
65 70 75 80

Thr Tyr Lys Ala Ala Phe Asp Leu Ser Phe Phe Leu Lys Glu Lys Gly
85 90 95

Gly Leu Glu Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp 100 105 110

Leu Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr
115 120 125

Thr Pro Gly Pro Gly Val Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe 130 135 140

Lys Leu Val Pro Val Asp Pro Arg Glu Val Glu Glu Ala Asn Glu Gly 145 150 155 160

Glu Asn Asn Cys Leu Leu His Pro Met Ser Gln His Gly Met Glu Asp 165 170 175

Glu Asp Arg Glu Val Leu Lys Trp Lys Phe Asp Ser His Leu Ala Arg 180 185 190

Arg His Met Ala Arg Glu Leu His Pro Glu Tyr Tyr Lys Asp Cys 195 200 205

<210> 183

<211> 624

<212> DNA

<213> Human immunodeficiency virus

<400> 183

atgggcggca agtggtcaa gtcctcatc gtggctggc ccgccgtgcg cgagcgcatc 60 cgccgcaccg agcccgcgc cgagggcgtg ggcgccgct cccaggacct ggacaagcac 120 ggcgccctga cctcctcaa caccgccacc aacaacgccg actgcgcct gctggaggcc 180 caggaggagg aggaggagt gggcttccc gtgcgcccc aggtgcccct gcgccccatg 240 acctacaagg ccgccttcga cctgtccttc ttcctgaagg agaagggcgg cctggaggc 300 ctgatctact ccaagaagcg ccaggagatc ctggacctgt gggtgtacca cacccagggc 360 tacttcccc actggcagaa ctacacccc ggccccggcg tgcgctaccc cctgaccttc 420 ggctggtgct tcaagctggt gcccgtggac ccccgcgagg tggaggaggc caacgagggc 480 gagaacaact gcctgctgaa ccccatgtcc cagcacggca tggaggacga ggaccgcgag 540 gtgctgaagt ggaagttcga ctccacctg gcccgccc acatggcc acatggccc ccgaggtact acaaggactg ctaa

<210> 184

<211> 207

<212> PRT

<213> Human immunodeficiency virus

<400> 184

Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Ala Val 1 5 10 15

Arg Glu Arg Met Arg Arg Thr Glu Pro Ala Ala Glu Gly Val Gly Ala
20 25 30

Ala Ser Gln Asp Leu Asp Lys His Gly Ala Leu Thr Ser Ser Asn Thr 35 40 45

Ala Ala Asn Asn Ala Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu 50 55 60

Glu Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met 65 70 75 80

Thr Tyr Lys Ala Ala Phe Asp Leu Ser Phe Phe Leu Lys Glu Lys Gly

Gly Leu Asp Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp 100 105 110

Leu Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr 115 120 125

Thr Pro Gly Pro Gly Val Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe 130 135 140

Lys Leu Val Pro Val Asp Pro Arg Glu Val Glu Glu Ala Asn Glu Gly 145 150 155 160

Glu Asn Asn Cys Leu Leu His Pro Met Ser Gln His Gly Met Glu Asp 165 170 175

Glu Asp Arg Glu Val Leu Lys Trp Lys Phe Asp Ser His Leu Ala Arg 180 185 190

Arg His Met Ala Arg Glu Leu His Pro Glu Tyr Tyr Lys Asp Cys 195 200 205

<210> 185

<211> 624

<212> DNA

<213> Human immunodeficiency virus

<400> 185

atgggcggca agtggtcaa gtcctcatc gtggctggc ccgccgtgcg cgagcgcatg 60 cgccgcaccg agcccgcgc cgagggcgtg ggcgccgct cccaggacct ggacaagcac 120 ggcgccctga cctcctcaa caccgccgc aacaacgccg actgcgcct gctggaggcc 180 caggaggagg aggaggaggt gggcttccc gtgcgcccc aggtgcccct gcgccccatg 240 acctacaagg ccgccttcga cctgtccttc ttcctgaagg agaagggcgg cctggacggc 300 ctgatctact ccaagaagcg ccaggagatc ctggacctgt gggtgtacca cacccagggc 360 tacttccccg actggcagaa ctacacccc ggccccggcg tgcgctaccc cctgaccttc 420 ggctggtgct tcaagctggt gcccgtggac ccccgcgagg tggaggaggc caacgagggc 480 gagaacaact gcctgctgaa ctcccacctg gcccgccgc acatggcca cgagctgcac 600 gtgctgaagt ggaagttcga ctcccacctg gcccgcgc acatggccc cgagctgcac 600

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<210> 186
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<211> 207

<212> PRT

<213> Human immunodeficiency virus

<400> 186

Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Ala Ile
1 5 10 15

Arg Glu Arg Ile Arg Arg Thr Glu Pro Ala Ala Asp Gly Val Gly Ala
20 25 30

Val Ser Arg Asp Leu Glu Lys His Gly Ala Ile Thr Ser Ser Asn Thr 35 40 45

Ala Ala Thr Asn Ala Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu Asp 50 55 60

Glu Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met 65 70 75 80

Thr Tyr Lys Ala Ala Leu Asp Leu Ser His Phe Leu Lys Glu Lys Gly
85 90 95

Gly Leu Glu Gly Leu Val Trp Ser Gln Lys Arg Gln Glu Ile Leu Asp 100 105 110

Leu Trp Val Tyr Asn Thr Gln Gly Phe Phe Pro Asp Trp Gln Asn Tyr 115 120 125

Thr Pro Gly Pro Gly Ile Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe 130 135 140

Glu Leu Val Pro Val Asp Pro Glu Glu Val Glu Glu Ala Thr Glu Gly
145 150 155 160

Glu Asn Asn Cys Leu Leu His Pro Met Cys Gln His Gly Met Glu Asp 165 170 175

Pro Glu Arg Glu Val Leu Met Trp Arg Phe Asn Ser Arg Leu Ala Phe 180 185 190

Glu His Lys Ala Arg Val Leu His Pro Glu Phe Tyr Lys Asp Cys 195 200 205

<210> 187

<211> 624

<212> DNA

<213> Human immunodeficiency virus

<400> 187

atgggcggca agtggtccaa gtcctccatc gtgggctggc ccgccatccg cgagcgcatc 60 cgccgcaccg agcccgccgc cgacggcgtg ggcgccgtgt cccgcgacct ggagaagcac 120

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ggcgccatca cctcctccaa caccgccgcc accaacgccg actgcgcctg gctggaggcc 180
caggaggagg acgaggaggt gggcttcccc gtgcgccccc aggtgcccct gcgccccatg 240
acctacaagg ccgccctgga cctgtcccac ttcctgaagg agaagggcgg cctggagggc 300
ctggtgtggt cccagaagcg ccaggagatc ctggacctgt gggtgtacaa cacccagggc 360
ttetteeceg actggeagaa etacaecece ggeeceggea teegetaece eetgaeette 420
ggctggtgct tcgagctggt gcccgtggac cccgaggagg tggaggaggc caccgagggc 480
gagaacaact gcctgctgca ccccatgtgc cagcacggca tggaggaccc cgagcgcgag 540
gtgctgatgt ggcgcttcaa ctcccgcctg gccttcgagc acaaggcccg cgtgctgcac 600
cccgagttct acaaggactg ctaa
<210> 188
<211> 205
<212> PRT
<213> Human immunodeficiency virus
<400> 188
Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Ala Val
                                                          15
                  5
                                     10
Arg Glu Arg Met Arg Pro Thr Pro Pro Ala Ala Glu Gly Val Gly Ala
Val Ser Gln Asp Leu Glu Arg Arg Gly Ala Ile Thr Ser Ser Asn Thr
                                                 45
                             40
Gly Ala Thr Asn Pro Asp Leu Ala Trp Leu Glu Ala Gln Glu Glu
     50
Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr
Tyr Lys Gly Ala Val Asp Leu Ser His Phe Leu Lys Glu Lys Gly Gly
                                                          95
Leu Glu Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp Leu
                                105
Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr Thr
                            120
                                                125
Pro Gly Pro Gly Ile Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe Lys
                        135
    130
Leu Val Pro Val Asp Pro Glu Glu Val Glu Lys Ala Asn Glu Gly Glu
                                         155
                    150
145
Asn Asn Cys Leu Leu His Pro Met Ser Gln His Gly Met Glu Asp Glu
                                    170
Asp Arg Glu Val Leu Ile Trp Lys Phe Asp Ser Arg Leu Ala Leu Arg
            180
                                185
His Ile Ala Arg Glu Arg His Pro Glu Phe Tyr Gln Asp
```

200

195

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<210> 189
<211> 618
<212> DNA
<213> Human immunodeficiency virus
<400> 189
atgggcggca agtggtccaa gtcctccatc gtgggctggc ccgccgtgcg cgagcgcatg 60
egeceeacce ecceegeege egagggegtg ggegeegtgt eccaggacet ggagegeege 120
qqcqccatca cctcctccaa caccggcgcc accaaccccg acctggcctg gctggaggcc 180
caggaggagg aggaggtggg cttccccgtg cgcccccagg tgcccctgcg ccccatgacc 240
tacaaqqqcq ccqtqqacct qtcccacttc ctqaaqqaqa aqqqcqgcct ggagggcctg 300
atctactcca agaagcqcca ggagatcctg gacctqtggg tgtaccacac ccagggctac 360
ttccccgact ggcagaacta caccccggc cccggcatcc gctaccccct gaccttcggc 420
tggtgcttca agctggtgcc cgtggacccc gaggaggtgg agaaggccaa cgagggcgag 480
aacaactgcc tgctgcaccc catgtcccag cacggcatgg aggacgagga ccgcgaggtg 540
ctgatctgga agttcgactc ccgcctggcc ctgcgccaca tcgcccgcga gcgccacccc 600
gagttctacc aggactaa
<210> 190
<211> 205
<212> PRT
<213> Human immunodeficiency virus
<400> 190
Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Thr Ile
Arg Glu Arg Ile Arg Arg Thr Pro Val Ala Ala Glu Gly Val Gly Ala
             20
Val Ser Gln Asp Leu Asp Lys His Gly Ala Ile Thr Ser Ser Asn Thr
Arg Ala Thr Asn Ala Asp Leu Ala Trp Leu Glu Ala Gln Glu Asp Glu
                         55
Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr
                                                              80
 65
                     70
Tyr Lys Ala Ala Phe Asp Leu Ser His Phe Leu Lys Glu Lys Gly Gly
                                     90
Leu Glu Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp Leu
            100
                                105
                                                     110
Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr Thr
        115
Pro Gly Pro Gly Thr Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe Lys
                        135
Leu Val Pro Val Asp Pro Glu Glu Val Glu Lys Ala Asn Glu Gly Glu
145
                    150
                                        155
                                                             160
Asn Asn Cys Leu Leu His Pro Met Ser Leu His Gly Met Glu Asp Glu
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170

175

Asp Arg Glu Val Leu Lys Trp Lys Phe Asp Ser Arg Leu Ala Leu Arg 185 His Ile Ala Arg Glu Arg His Pro Glu Tyr Tyr Lys Asp 205 200 <210> 191 <211> 618 <212> DNA <213> Human immunodeficiency virus <400> 191 atgggeggea agtggteeaa gteeteeate gtgggetgge ceaecateeg egagegeate 60 egeegeacee eegtggeege egagggegtg ggegeegtgt eecaggacet ggacaagcae 120 ggegecatea cetectecaa caceegegee accaaegeeg acetggeetg getggaggee 180 caggaggacg aggaggtggg cttccccgtg cgcccccagg tgcccctgcg ccccatgacc 240 tacaaggccg ccttcgacct gtcccacttc ctgaaggaga agggcggcct ggagggcctg 300 atctactcca agaagcgcca ggagatcctg gacctgtggg tgtaccacac ccagggctac 360 ttccccgact ggcagaacta caccccggc cccggcaccc gctaccccct gaccttcggc 420 tggtgcttca agctggtgcc cgtggacccc gaggaggtgg agaaggccaa cgagggcgag 480 aacaactgcc tgctgcaccc catgtccctg cacggcatgg aggacgagga ccgcgaggtg 540 ctgaagtgga agttcgactc ccgcctggcc ctgcgccaca tcgcccgcga gcgccacccc 600 gagtactaca aggactaa <210> 192 <211> 207 <212> PRT <213> Human immunodeficiency virus <400> 192 Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Glu Val Arg Glu Arg Ile Arg Gln Thr Pro Pro Ala Ala Glu Gly Val Gly Ala Val Ser Gln Asp Leu Ala Arg His Gly Ala Ile Thr Ser Ser Asn Thr 35 40 45 Ala Ala Asn Asn Pro Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu Asp 55 Ser Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met 65 70 75 Thr Tyr Lys Gly Ala Phe Asp Leu Ser Phe Phe Leu Lys Glu Lys Gly Gly Leu Asp Gly Leu Ile Tyr Ser Lys Lys Arg Gln Asp Ile Leu Asp 105

Leu Trp Val Tyr Asn Thr Gln Gly Phe Phe Pro Asp Trp Gln Asn Tyr

125

120

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Thr Pro Gly Pro Gly Thr Arg Phe Pro Leu Thr Phe Gly Trp Cys Phe
                        135
    130
Lys Leu Val Pro Met Asp Pro Ala Glu Val Glu Glu Ala Asn Lys Gly
                    150
                                        155
145
Glu Asn Asn Ser Leu Leu His Pro Ile Cys Gln His Gly Met Glu Asp
                                    170
                165
Glu Asp Arg Glu Val Leu Val Trp Arg Phe Asp Ser Ser Leu Ala Arg
            180
Arg His Ile Ala Arg Glu Leu His Pro Glu Tyr Tyr Lys Asp Cys
                            200
<210> 193
<211> 624
<212> DNA
<213> Human immunodeficiency virus
<400> 193
atgggcggca agtggtccaa gtcctccatc gtgggctggc ccgaggtgcg cgagcgcatc 60
cqccaqaccc ccccgccgc cgagggcgtg ggcgccgtgt cccaggacct ggcccgccac 120
ggcgccatca cctcctccaa caccgccgcc aacaaccccg actgcgcctg gctggaggcc 180
caggaggagg actccgaggt gggcttcccc gtgcgccccc aggtgcccct gcgccccatg 240
acctacaagg gcgccttcga cctgtccttc ttcctgaagg agaagggcgg cctggacggc 300
ctgatctact ccaagaagcg ccaggacatc ctggacctgt gggtgtacaa cacccagggc 360
ttcttccccg actggcagaa ctacaccccc ggccccggca cccgcttccc cctgaccttc 420
ggctggtgct tcaagctggt gcccatggac cccgccgagg tggaggaggc caacaagggc 480
gagaacaact ccctgctgca ccccatctgc cagcacggca tggaggacga ggaccgcgag 540
qtqctqqtqt qqcqcttcga ctcctccctg gcccgccgcc acategcccg cgagetgcac 600
                                                                   624
cccgagtact acaaggactg ctaa
<210> 194
<211> 207
<212> PRT
<213> Human immunodeficiency virus
<400> 194
Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Gly Gly Trp Pro Ala Ile
                                                          15
                  5
Arg Glu Arg Ile Arg Arg Ala Glu Pro Ala Ala Glu Gly Val Gly Ala
                                 25
Val Ser Arg Asp Leu Asp Arg Arg Gly Ala Val Thr Ile Asn Asn Thr
                             40
Ala Ser Thr Asn Pro Asp Ser Ala Trp Leu Glu Ala Gln Glu Glu Glu
                         55
     50
Glu Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met
Thr Tyr Lys Gly Ala Phe Asp Leu Ser His Phe Leu Lys Glu Lys Gly
```

85 90 95 Gly Leu Glu Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp 100 105 Leu Trp Val Tyr Asn Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr Thr Pro Gly Pro Gly Glu Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe 135 Lys Leu Val Pro Val Asp Pro Gln Glu Val Glu Lys Ala Asn Glu Gly 160 145 150 155 Glu Asn Asn Ser Leu Leu His Pro Ile Cys Gln His Gly Met Glu Asp 170 Glu Glu Arg Glu Val Leu Met Trp Lys Phe Asp Ser Arg Leu Ala Phe 185 190 180 Arg His Ile Ala Arg Glu Leu His Pro Glu Phe Tyr Lys Asp Cys 200 <210> 195 <211> 624 <212> DNA <213> Human immunodeficiency virus

<400> 195

atgggegga agtggtcaa gtcctcatc ggeggetgg cegcatceg egagegate 60 cgcegegeeg agceegee egagggegtg ggegeegtgt ceegegaeet ggacegeege 120 ggegeegtga ccatcaacaa cacegeetee accaaeeeeg acteegeetg getggaggee 180 caggaggagg aggaggaggt gggetteeee gtgegeeeee aggtgeeeet gegeeeeatg 240 acetacaagg gegeettega eetgteeae tteetgaagg agaagggegg cetggagge 300 ctgatetact ecaagaageg ecaggagate etggaeetgt gggtgtacaa cacecaggge 360 tactteeeg actggeagaa etacaeeeee ggeeeeggg agegetaeee eetggaeette 420 ggetggtget teaagetggt geeegtggae eeeegggg tggagaagge eaaegagge 480 gagaacaaet eeetgetgea eeeeegeetg geetteegee acategeeg ggagetgeae 600 ceegagttet acaaggaetg etaa

<210> 196 <211> 204 <212> PRT <213> Human immunodeficiency virus

<400> 196

Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Gln Val 1 5 10 15

Arg Glu Arg Ile Lys Gln Thr Pro Pro Ala Thr Glu Gly Val Gly Ala 20 25 30

Val Ser Gln Asp Leu Asp Lys His Gly Ala Val Thr Ser Ser Asn Met
35 40 45

```
Asn Asn Ala Asp Cys Val Trp Leu Arg Ala Gln Glu Glu Glu Val
50 55 60
```

Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr Tyr Lys
65 70 75 80

Gly Ala Phe Asp Leu Ser Phe Phe Leu Lys Glu Lys Gly Gly Leu Asp 85 90 95

Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp Leu Trp Val 100 105 110

Tyr Asn Thr Gln Gly Phe Phe Pro Asp Trp Gln Asn Tyr Thr Pro Gly
115 120 125

Pro Gly Ile Arg Tyr Pro Leu Cys Phe Gly Trp Cys Phe Lys Leu Val 130 135 140

Pro Val Asp Pro Arg Glu Val Glu Glu Asp Asn Lys Gly Glu Asn Asn 145 150 155 160

Cys Leu Leu His Pro Met Ser Gln His Gly Ile Glu Asp Glu Glu Arg 165 170 175

Glu Val Leu Met Trp Lys Phe Asp Ser Ala Leu Ala Arg Lys His Ile 180 185 190

Ala Arg Glu Leu His Pro Glu Tyr Tyr Lys Asp Cys 195 200

<210> 197

<211> 615

<212> DNA

<213> Human immunodeficiency virus

<400> 197

atgggcggca agtggtccaa gtcctccatc gtgggctggc cccaggtgcg cgagcgcatc 60 aagcagaccc ccccgccac cgagggcgtg ggcgccgtgt cccaggacct ggacaagcac 120 ggcgccgtga cctcctcaa catgaacaac gccgactgcg tgtggctgcg cgcccaggag 180 gaggaggagg tgggcttccc cgtgcgcccc caggtgcccc tgcgcccat gacctacaag 240 ggcgccttcg acctgtcctt cttcctgaag gagaagggcg gcctggacgg cctgatctac 300 tccaagaagc gccaggagat cctggacctg tgggtgtaca acacccaggg cttcttcccc 360 gactggcaga actacaccc cggccccggc atccgctacc ccctgtgctt cggctggtc 420 ttcaagctgg tgcccgtga cccccgcgag gtggaggagg acaacaaggg cgagaacaac 480 tgcctgctgc accccatgtc ccagcacggc atcgagacg aggagcgca ggtgctgatg 540 tggaagttcg accccatgtc ggcccgaag cacatcgcc gcgagctgca ccccgagtac 600 tacaaggact gctaa

<210> 198

<211> 207

<212> PRT

<213> Human immunodeficiency virus

<400> 198

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Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Gln Val
Arg Glu Arg Ile Arg Arg Ala Pro Ala Pro Ala Ala Arg Gly Val Gly
                                 25
Pro Val Ser Gln Asp Leu Asp Lys Tyr Gly Ala Val Thr Ser Ser Asn
                             40
Thr Ala Ala Asn Asn Ala Asp Cys Ala Trp Leu Glu Ala Gln Lys Glu
                         55
Glu Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met
                                         75
Thr Tyr Lys Gly Ala Phe Asp Leu Ser His Phe Leu Lys Glu Lys Gly
Gly Leu Asp Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp
                                105
Leu Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr
                            120
                                                125
Thr Pro Gly Pro Gly Ile Arg Phe Pro Leu Thr Phe Gly Trp Cys Tyr
                        135
    130
Lys Leu Val Pro Val Asp Pro Asp Glu Val Glu Glu Ala Thr Glu Gly
                                        155
Glu Asn Asn Ser Leu Leu His Pro Ile Cys Gln His Gly Met Asp Asp
                                    170
                165
Glu Glu Lys Glu Val Leu Met Trp Lys Phe Asp Ser Arg Leu Ala Leu
Thr His Arg Ala Arg Glu Leu His Pro Glu Phe Tyr Lys Asp Cys
                            200
<210> 199
<211> 624
<212> DNA
<213> Human immunodeficiency virus
atgggeggea agtggteeaa gteeteeate gtgggetgge ceeaggtgeg egagegeate 60
cgccgcgccc ccgcccccgc cgcccgcggc gtgggccccg tgtcccagga cctggacaag 120
tacggcgccg tgacctcctc caacaccgcc gccaacaacg ccgactgcgc ctggctggag 180
gcccagaagg aggaggaggt gggcttcccc gtgcgccccc aggtgcccct gcgccccatg 240
acctacaagg gcgccttcga cctgtcccac ttcctgaagg agaagggcgg cctggacggc 300
ctgatctact ccaagaagcg ccaggagatc ctggacctgt gggtgtacca cacccagggc 360
tacttccccg actggcagaa ctacaccccc ggccccggca tccgcttccc cctgaccttc 420
qqctqgtgct acaagctggt gcccgtggac cccgacgagg tggaggaggc caccgagggc 480
qaqaacaact ccctgctgca ccccatctgc cagcacggca tggacgacga ggagaaggag 540
```

gtgctgatgt ggaagttcga ctcccgcctg gccctgaccc accgcgcccg cgagctgcac 600

cccgagttct acaaggactg ctaa

<210> 200

<211> 212

<212> PRT

<213> Human immunodeficiency virus

<400> 200

Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Ala Ile
1 5 10 15

Arg Glu Arg Met Arg Gln Arg Gly Pro Ala Gln Ala Glu Pro Ala Ala
20 25 30

Ala Gly Val Gly Ala Val Ser Gln Asp Leu Asp Lys His Gly Ala Ile 35 40 45

Thr Ser Ser Asn Thr Ala Ala Thr Asn Pro Asp Lys Ala Trp Leu Glu 50 55 60

Ala Gln Glu Glu Glu Glu Val Gly Phe Pro Val Arg Pro Gln Val
65 70 75 80

Pro Leu Arg Pro Met Thr Phe Lys Ala Ala Leu Asp Leu Ser His Phe
85 90 95

Leu Lys Glu Lys Gly Gly Leu Asp Gly Leu Ile Tyr Ser Lys Lys Arg
100 105 110

Gln Glu Ile Leu Asp Leu Trp Val Tyr Asn Thr Gln Gly Tyr Phe Pro 115 120 125

Asp Trp Gln Asn Tyr Thr Pro Gly Pro Gly Glu Arg Phe Pro Leu Cys 130 135 140

Phe Gly Trp Cys Phe Lys Leu Val Pro Val Asp Pro Gln Glu Val Glu 145 150 155 160

Glu Ala Thr Glu Gly Glu Asn Asn Cys Leu Leu His Pro Ile Ser Gln 165 170 175

His Gly Met Glu Asp Glu Glu Arg Glu Val Leu Lys Trp Lys Phe Asp 180 185 190

Ser Arg Leu Ala Tyr Lys His Ile Ala Arg Glu Leu His Pro Glu Phe 195 200 205

Tyr Lys Asp Cys 210

<210> 201

<211> 639

<212> DNA

<213> Human immunodeficiency virus

<400> 201

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atgggcggca agtggtccaa gtcctccatc gtgggctggc ccgccatccg cgagcgcatg 60
cgccagcgcg gccccgccca ggccgagccc gccgccgccg gcgtgggcgc cgtgtcccag 120
gacctggaca agcacqqcqc catcacctcc tccaacaccg ccqccaccaa ccccgacaag 180
gcctggctgg aggcccagga ggaggaggag gaggtgggct tccccgtgcg cccccaggtg 240
cccctgcgcc ccatgacctt caaggccgcc ctggacctgt cccacttcct gaaggagaag 300
ggcggcctgg acggcctgat ctactccaag aagcgccagg agatcctgga cctgtgggtg 360
tacaacaccc agggctactt ccccgactgg cagaactaca cccccggccc cggcgagcgc 420
ttccccctgt gcttcggctg gtgcttcaag ctggtgcccg tggaccccca ggaggtggag 480
gaggecaccg agggegagaa caactgeetg etgeacceca teteceagea eggeatggag 540
gacgaggagc gcgaggtgct gaagtggaag ttcgactccc gcctggccta caagcacatc 600
gcccgcgagc tgcaccccga gttctacaag gactgctaa
<210> 202
<211> 208
<212> PRT
<213> Human immunodeficiency virus
<400> 202
Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Gln Val
Arg Glu Arg Met Arg Asn Pro Pro Thr Glu Gly Ala Ala Glu Gly Val
Gly Ala Val Ser Gln Asp Leu Asp Lys His Gly Ala Ile Thr Ser Ser
                             40
Asn Thr Ala Thr Thr Asn Ala Ala Cys Ala Trp Leu Glu Ala Gln Thr
     50
Glu Asp Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro
Met Thr Tyr Lys Gly Ala Phe Asp Leu Ser Phe Phe Leu Lys Glu Lys
                 85
                                     90
Gly Gly Leu Asp Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu
            100
                                105
Asp Leu Trp Val Tyr His Thr Gln Gly Phe Phe Pro Asp Trp Gln Asn
Tyr Thr Pro Gly Pro Gly Ile Arg Tyr Pro Leu Thr Phe Gly Trp Cys
Tyr Lys Leu Val Pro Val Asp Pro Lys Glu Val Glu Asp Thr Lys
145
                                        155
Gly Glu Asn Asn Cys Leu Leu His Pro Met Cys Gln His Gly Val Glu
                165
                                    170
Asp Glu Glu Arg Glu Val Leu Met Trp Lys Phe Asp Ser Ser Leu Ala
            180
                                185
```

Arg Arg His Ile Ala Arg Glu Met His Pro Glu Phe Tyr Lys Asp Cys

200

195

```
<211> 627
<212> DNA
<213> Human immunodeficiency virus
<400> 203
atgggcggca agtggtccaa gtcctccatc gtgggctggc cccaggtgcg cgagcgcatg 60
cqcaaccccc ccaccgaggg cgccgccgag ggcgtgggcg ccgtgtccca ggacctggac 120
aagcacggcg ccatcacctc ctccaacacc gccaccacca acgccgcctg cgcctggctg 180
gaggcccaga ccgaggacga ggtgggcttc cccgtgcgcc cccaggtgcc cctgcgcccc 240
atgacctaca agggcgcctt cgacctgtcc ttcttcctga aggagaaggg cggcctggac 300
ggcctgatct actccaagaa gcgccaggag atcctggacc tgtgggtgta ccacacccag 360
ggettettee eegactggea gaactacaee eeeggeeeeg geateegeta eeeeetgaee 420
ttcggctggt gctacaagct ggtgcccgtg gaccccaagg aggtggagga ggacaccaag 480
ggcgagaaca actgcctgct gcaccccatg tgccagcacg gcgtggagga cgaggagcgc 540
gaggtgctga tgtggaagtt cgactcctcc ctggcccgcc gccacatcgc ccgcgagatg 600
caccccgagt tctacaagga ctgctaa
<210> 204
<211> 206
<212> PRT
<213> Human immunodeficiency virus
<400> 204
Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Ala Ile
                  5
Arg Glu Arg Ile Arg Arg Thr Glu Pro Ala Ala Asp Gly Val Gly Ala
             20
Val Ser Arg Asp Leu Glu Lys His Gly Ala Ile Thr Ser Ser Asn Thr
                             40
Ala Asp Thr Asn Ala Asp Cys Ala Trp Leu Glu Thr Gln Glu Glu
     50
Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr
Phe Lys Gly Ala Leu Asp Leu Ser Phe Phe Leu Lys Glu Lys Gly Gly
                                     90
                                                         95
Leu Glu Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp Leu
                                105
            100
Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp His Asn Tyr Thr
                            120
Pro Gly Pro Gly Val Arg Phe Pro Leu Thr Phe Gly Trp Cys Phe Lys
```

140

<210> 203

130

```
Leu Val Pro Val Asp Pro Arg Glu Val Glu Glu Ala Asn Glu Gly Glu
                    150
                                        155
145
Asp Asn Cys Leu Leu His Pro Val Cys Gln His Gly Met Glu Asp Glu
                165
                                    170
His Arg Glu Val Leu Lys Trp Lys Phe Asp Ser Gln Leu Ala His Arg
                                185
            180
His Arg Ala Arg Glu Leu His Pro Glu Phe Tyr Lys Asp Cys
                            200
<210> 205
<211> 621
<212> DNA
<213> Human immunodeficiency virus
<400> 205
atgggeggea agtggteeaa gteeteeate gtgggetgge cegeeateeg egagegeate 60
cgccgcaccg agcccgccgc cgacggcgtg ggcgccgtgt cccgcgacct ggagaagcac 120
ggcgccatca cctcctccaa caccgccgac accaacgccg actgcgcctg gctggagacc 180
caqqaqqaqq aqqaggtggg cttccccgtg cgcccccagg tgcccctgcg ccccatgacc 240
ttcaagggcg ccctggacct gtccttcttc ctgaaggaga agggcggcct ggagggcctg 300
atctactcca agaagcgcca ggagatcctg gacctgtggg tgtaccacac ccagggctac 360
ttccccgact ggcacaacta caccccggc cccggcgtgc gcttccccct gaccttcggc 420
tggtgcttca agctggtgcc cgtggacccc cgcgaggtgg aggaggccaa cgagggcgag 480
gacaactgcc tgctgcaccc cgtgtgccag cacggcatgg aggacgagca ccgcgaggtg 540
ctgaagtgga agttcgactc ccagctggcc caccgccacc gcgcccgcga gctgcacccc 600
gagttctaca aggactgcta a
                                                                   621
<210> 206
<211> 207
<212> PRT
<213> Human immunodeficiency virus
<400> 206
Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Ala Val
                                     10
Arg Glu Arg Ile Arg Arg Thr Asp Pro Ala Ala Glu Gly Val Gly Ala
             20
Ala Ser Arg Asp Leu Glu Lys Tyr Gly Ala Ile Thr Ser Ser Asn Thr
Ala Gln Thr Asn Pro Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu Glu
Glu Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met
 65
                     70
Thr Tyr Lys Gly Ala Phe Asp Leu Ser Phe Phe Leu Lys Glu Lys Gly
                                     90
Gly Leu Glu Gly Leu Ile Tyr Ser Lys Arg Arg Gln Asp Ile Leu Asp
```

100 105 110

Leu Trp Val Tyr Asn Thr Gln Gly Phe Phe Pro Asp Trp Gln Asn Tyr
115 120 125

Thr Pro Gly Pro Gly Ile Arg Tyr Pro Leu Thr Phe Gly Trp Cys Tyr 130 135 140

Lys Leu Val Pro Val Asp Pro Arg Glu Val Glu Glu Ala Asn Glu Gly
145 150 155 160

Glu Asn Asn Ser Leu Leu His Pro Met Ser Leu His Gly Met Glu Asp 165 170 175

Pro His Gly Glu Val Leu Met Trp Lys Phe Asp Ser Asn Leu Ala His
180 185 190

Lys His Met Ala Arg Glu Leu His Pro Glu Tyr Tyr Lys Asp Cys 195 200 205

<210> 207

<211> 624

<212> DNA

<213> Human immunodeficiency virus

<400> 207

<210> 208

<211> 208

<212> PRT

<213> Human immunodeficiency virus

<400> 208

Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Glu Ile
1 5 10 15

Arg Glu Arg Leu Arg Arg Thr Pro Pro Thr Ala Ala Ala Glu Gly Val 20 25 30

Gly Ala Val Ser Lys Asp Leu Glu Lys His Gly Ala Val Thr Ser Ser 35 40 45

Asn Thr Ala Gln Thr Asn Ala Ala Cys Ala Trp Leu Glu Ala Gln Glu 50 60

Glu Glu Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr Tyr Lys Gly Ala Phe Asp Leu Gly Phe Phe Leu Lys Glu Lys 85 90 Gly Gly Leu Asp Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu 105 Asp Leu Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn 120 115 Tyr Thr Pro Gly Pro Gly Ile Arg Tyr Pro Leu Cys Phe Gly Trp Cys 135 130 Phe Lys Leu Val Pro Val Glu Pro Arg Glu Val Glu Glu Ala Asn Glu 155 145 150 Gly Glu Asn Asn Cys Leu Leu His Pro Met Ser Gln His Gly Met Asp 165 170 Asp Glu Glu Arg Glu Val Leu Met Trp Lys Phe Asp Ser Ser Leu Ala 185 Arg Arg His Ile Ala Arg Glu Leu His Pro Asp Phe Tyr Lys Asp Cys

200

205

```
<210> 209
<211> 627
<212> DNA
<213> Human immunodeficiency virus
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<400> 209
atgggcgca agtggtccaa gtcctccatc gtgggctggc ccgagatccg cgagcgcctg 60
cgccgcaccc ccccaccgc cgccgcag ggcgtgggcg ccgtgtccaa ggacctggag 120
aagcacggcg ccgtgacctc ctccaacacc gcccagacca acgccgcctg cgcctggctg 180
gaggcccagg aggaggaga ggtgggcttc cccgtgcgc cccaggtgcc cctgcgccc 240
atgacctaca agggcgctt cgacctgggc ttcttcctga aggagaaggg cggcctggac 300
ggcctgatct actccaagaa gcgccaggag atcctggac tgtgggtta ccacacccag 360
ggctacttcc ccgactggca gaactacacc cccggccccg gcatccgcta ccccctgtgc 420
ttcggctggt gcttcaagct ggtgcccgtg gagccccgcg aggtggaga ggccaacgag 480
ggcgagaaca actgcctgct gcaccccatg tcccagcacg gcatcgca ccgcgagctg 600
caccccgact tctacaagga ctgctaa

```
<210> 210
<211> 206
<212> PRT
<213> Human immunodeficiency virus
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Met Gly Gly Lys Trp Ser Lys Ser Ser Ile Val Gly Trp Pro Asp Ile
Arg Glu Arg Met Arg Arg Ala Pro Pro Ala Ala Glu Gly Val Gly Ala
                                 25
Val Ser Gln Asp Leu Glu Asn Arg Gly Ala Ile Thr Ser Ser Asn Thr
                             40
Arq Ala Asn Asn Pro Asp Leu Ala Trp Leu Glu Ala Gln Glu Glu Glu
                         55
Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met Thr
                     70
Tyr Lys Gly Ala Leu Asp Leu Ser His Phe Leu Lys Glu Lys Gly Gly
Leu Glu Gly Leu Ile Tyr Ser Lys Lys Arg Gln Glu Ile Leu Asp Leu
Trp Val Tyr His Thr Gln Gly Tyr Phe Pro Asp Trp Gln Asn Tyr Thr
                            120
Pro Gly Pro Gly Ile Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe Lys
    130
                        135
Leu Val Pro Val Asp Pro Glu Glu Val Glu Lys Ala Asn Glu Gly Glu
                    150
                                        155
Asn Asn Cys Leu Leu His Pro Met Ser Gln His Gly Met Glu Asp Glu
                165
                                    170
                                                        175
Asp Arg Glu Val Leu Met Trp Lys Phe Asp Ser Arg Leu Ala Leu Arg
            180
                                185
His Ile Ala Arg Glu Lys His Pro Glu Phe Tyr Gln Asp Cys
                            200
<210> 211
<211> 621
<212> DNA
<213> Human immunodeficiency virus
<400> 211
atgggcggca agtggtccaa gtcctccatc gtgggctggc ccgacatccg cgagcgcatg 60
egeegegeee eeceegeege egagggegtg ggegeegtgt eecaggaeet ggagaacege 120
qqcqccatca cctcctccaa cacccgcgcc aacaaccccg acctggcctg gctggaggcc 180
caqqaqqaqq aqqaggtggg cttccccgtg cgcccccagg tgcccctgcg ccccatgacc 240
tacaagggcg ccctggacct gtcccacttc ctgaaggaga agggcggcct ggagggcctg 300
atctactcca agaagcgcca ggagatcctg gacctgtggg tgtaccacac ccagggctac 360
ttccccgact ggcagaacta caccccggc cccggcatcc gctaccccct gaccttcggc 420
```

tggtgcttca agctggtgcc cgtggacccc gaggaggtgg agaaggccaa cgagggcgag 480 aacaactgcc tgctgcaccc catgtcccag cacggcatgg aggacgagga ccgcgaggtg 540 ctgatgtgga agttcgactc ccgcctggcc ctgcgccaca tcgcccgcga gaagcacccc 600

gagttctacc aggactgcta a

```
<210> 212
```

<211> 207

<212> PRT

<213> Human immunodeficiency virus

<400> 212

Met Gly Gly Lys Trp Ser Lys Cys Ser Ile Val Gly Trp Pro Glu Val 1 5 10 15

Arg Glu Arg Ile Arg Arg Thr Pro Pro Ala Ala Val Gly Val Gly Ala
20 25 30

Val Ser Gln Asp Leu Ala Lys His Gly Ala Ile Thr Ser Ser Asn Thr 35 40 45

Ala Ala Asn Asn Pro Asp Cys Ala Trp Leu Glu Ala Gln Glu Glu Asp
50 55 60

Ser Glu Val Gly Phe Pro Val Arg Pro Gln Val Pro Leu Arg Pro Met 65 70 75 80

Thr Tyr Lys Gly Ala Phe Asp Leu Ser Phe Phe Leu Lys Glu Lys Gly
85 90 95

Gly Leu Asp Gly Leu Ile Tyr Ser Lys Gln Arg Gln Asp Ile Leu Asp 100 105 110

Leu Trp Val Tyr Asn Thr Gln Gly Phe Phe Pro Asp Trp Gln Asn Tyr 115 120 125

Thr Pro Gly Pro Gly Thr Arg Tyr Pro Leu Thr Phe Gly Trp Cys Phe 130 135 140

Lys Leu Glu Pro Val Asp Pro Ala Glu Val Glu Glu Ala Thr Lys Gly
145 150 155 160

Glu Asn Asn Ser Leu Leu His Pro Ile Cys Gln His Gly Met Glu Asp 165 170 175

Ala Asp Asn Glu Val Leu Ile Trp Arg Phe Asp Ser Ser Leu Ala Arg 180 185 190

Arg His Ile Ala Arg Glu Leu His Pro Asp Phe Tyr Lys Asp Cys 195 200 205

<210> 213

<211> 624

<212> DNA

<213> Human immunodeficiency virus

<400> 213

atgggeggea agtggteeaa gtgeteeate gtgggetgge eegaggtgeg egagegeate 60 egeegeacee eeceegeege egtgggegtg ggegeegtgt eecaggaeet ggeeaageae 120 ggegeeatea eeteeteeaa eacegeegee aacaaeeeeg actgegeetg getggaggee 180

caggaggagg actccgaggt gggcttcccc gtgcgccccc aggtgcccct gcgccccatg 240 acctacaagg gcgccttcga cctgtccttc ttcctgaagg agaagggcgg cctggacggc 300 ctgatctact ccaaqcagcg ccaggacatc ctggacctgt gggtgtacaa cacccagggc 360 ttcttccccg actggcagaa ctacaccccc ggccccggca cccgctaccc cctgaccttc 420 ggctggtgct tcaagctgga gcccgtggac cccgccgagg tggaggaggc caccaagggc 480 gagaacaact ccctgctgca ccccatctgc cagcacggca tggaggacgc cgacaacgag 540 gtgctgatct ggcgcttcga ctcctccctg gcccgccgcc acatcgcccg cgagctgcac 600 cccgacttct acaaggactg ctaa <210> 214 <211> 1002 <212> PRT <213> Human immunodeficiency virus <400> 214 Phe Phe Arg Glu Asn Leu Ala Phe Gln Gln Gly Glu Ala Arg Glu Phe Ser Ser Glu Gln Thr Arg Ala Asn Ser Pro Thr Ser Arg Glu Leu Arg 30 Val Arg Gly Gly Asp Asn Pro Leu Ser Glu Ala Gly Ala Glu Arg Gln Gly Thr Val Ser Leu Ser Phe Pro Gln Ile Thr Leu Trp Gln Arg Pro 55 Leu Val Thr Val Lys Ile Gly Gly Gln Leu Lys Glu Ala Leu Leu Asp 65 70 Thr Gly Ala Asp Asp Thr Val Leu Glu Glu Ile Asn Leu Pro Gly Lys Trp Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val Arg 105 110 100 Gln Tyr Asp Gln Ile Leu Ile Glu Ile Cys Gly Lys Lys Ala Ile Gly 120 115 Thr Val Leu Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn Met 135 Leu Thr Gln Ile Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile Glu 145 150 160 Thr Val Pro Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val Lys 170 Gln Trp Pro Leu Thr Glu Glu Lys Ile Lys Ala Leu Thr Glu Ile Cys 185 Thr Glu Met Glu Lys Glu Gly Lys Ile Ser Lys Ile Gly Pro Glu Asn 200 205 195

Pro Tyr Asn Thr Pro Ile Phe Ala Ile Lys Lys Lys Asp Ser Thr Lys

220

215

210

624

Trp 225	Arg	Lys	Leu	Val	Asp 230	Phe	Arg	Glu	Leu	Asn 235	Lys	Arg	Thr	Gln	Asp 240
Phe	Trp	Glu	Val	Gln 245	Leu	Gly	Ile	Pro	His 250	Pro	Ala	Gly	Leu	Lys 255	Lys
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Ala	Ser	Asp	Phe 740	Asn	Leu	Pro	Pro	Ile 745	Val	Ala	Lys	Glu	Ile 750	Val	Ala
Ser	Cys	Asp 755	Lys	Cys	Gln	Leu	Lys 760	Gly	Glu	Ala	Met	His 765	Gly	Gln	Val
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Asp Phe Trp Glu Val Gln Leu Gly Ile Pro His Pro Ala Gly Leu Lys

Lys Lys Lys Ser Val Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser 265 Val Pro Leu Asp Glu Ser Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro Ser Thr Asn Asn Glu Thr Pro Gly Ile Arg Tyr Gln Tyr Asn Val Leu Pro Gln Gly Trp Lys Gly Ser Pro Ala Ile Phe Gln Ser Ser Met Thr 315 Lys Ile Leu Glu Pro Phe Arg Ser Lys Asn Pro Glu Ile Ile Tyr 330 Gln Tyr Met Asp Asp Leu Tyr Val Gly Ser Asp Leu Glu Ile Gly Gln 345 340 His Arg Thr Lys Ile Glu Glu Leu Arg Ala His Leu Leu Ser Trp Gly Phe Thr Thr Pro Asp Lys Lys His Gln Lys Glu Pro Pro Phe Leu Trp 375 Met Gly Tyr Glu Leu His Pro Asp Lys Trp Thr Val Gln Pro Ile Glu 385 Leu Pro Glu Lys Glu Ser Trp Thr Val Asn Asp Ile Gln Lys Leu Val Gly Lys Leu Asn Trp Ala Ser Gln Ile Tyr Ala Gly Ile Lys Val Lys Gln Leu Cys Lys Leu Leu Arg Gly Ala Lys Ala Leu Thr Asp Ile Val Thr Leu Thr Glu Glu Ala Glu Leu Glu Leu Ala Glu Asn Arg Glu Ile 455 Leu Lys Asp Pro Val His Gly Val Tyr Tyr Asp Pro Ser Lys Asp Leu 465 Ile Ala Glu Ile Gln Lys Gln Gly Gln Asp Gln Trp Thr Tyr Gln Ile Tyr Gln Glu Pro Phe Lys Asn Leu Lys Thr Gly Lys Tyr Ala Arg Lys 505 Arg Ser Ala His Thr Asn Asp Val Lys Gln Leu Ala Glu Val Val Gln 515 Lys Val Val Met Glu Ser Ile Val Ile Trp Gly Lys Thr Pro Lys Phe Lys Leu Pro Ile Gln Lys Glu Thr Trp Glu Thr Trp Met Asp Tyr

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Lys Ala Gly Tyr Val Thr Asp Arg Gly Arg Gln Lys Val Val Ser Leu 610 620

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Val Asn Gln Ile Ile Glu Lys Leu Ile Gly Lys Asp Lys Val Tyr Leu 675 680 685

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Val Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu
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Gly Lys Val Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu
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Gly Ser Asn Phe Thr Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala 835 840 845

Asn Ile Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly

850 855 860

Val Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val 865 870 875 Arg Glu Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe 890 Ile His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly 905 Glu Arg Ile Ile Asp Ile Ile Ala Thr Asp Ile Gln Thr Lys Glu Leu Gln Lys Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp 935 Ser Arg Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly 955 945 950 960 Glu Gly Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro 970 965 Arg Arg Lys Ala Lys Ile Ile Arg Asp Tyr Gly Lys Gln Met Ala Gly 985

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- Met Leu Thr Gln Ile Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile 145 150 155 160
- Glu Thr Val Pro Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val 165 170 175
- Lys Gln Trp Pro Leu Thr Glu Glu Lys Ile Lys Ala Leu Thr Glu Ile 180 185 190
- Cys Thr Glu Met Glu Lys Glu Gly Lys Ile Ser Lys Ile Gly Pro Glu 195 200 205
- Asn Pro Tyr Asn Thr Pro Val Phe Ala Ile Lys Lys Lys Asp Ser Thr 210 225
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- Met Gly Tyr Glu Leu His Pro Asp Lys Trp Thr Val Gln Pro Ile Lys 385 390 395 400

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235

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- His Arg Ala Lys Ile Glu Glu Leu Arg Ala His Leu Leu Arg Trp Gly
- Phe Thr Thr Pro Asp Lys Lys His Gln Lys Glu Pro Pro Phe Leu Trp 370 375 380
- Met Gly Tyr Glu Leu His Pro Asp Lys Trp Thr Val Gln Pro Ile Lys 385 390 395 400
- Leu Pro Glu Lys Asp Ser Trp Thr Val Asn Asp Ile Gln Lys Leu Val
 405 410 415
- Gly Lys Leu Asn Trp Ala Ser Gln Ile Tyr Ala Gly Ile Lys Val Lys
 420 425 430
- Gln Leu Cys Lys Leu Leu Arg Gly Thr Lys Ala Leu Thr Asp Ile Val 435 440 445
- Thr Leu Thr Lys Glu Ala Glu Leu Glu Leu Glu Glu Asn Arg Glu Ile 450 455 460
- Leu Lys Asn Pro Val His Gly Val Tyr Tyr Asp Pro Ser Lys Asp Leu 465 470 475 480
- Ile Ala Glu Ile Gln Lys Gln Gly Gln Asp Gln Trp Thr Tyr Gln Ile 485 490 495
- Tyr Gln Glu Pro Phe Lys Asn Leu Lys Thr Gly Lys Tyr Ala Lys Arg
 500 505 510
- Lys Ser Thr His Thr Asn Asp Val Lys Gln Leu Thr Glu Ala Val Gln 515 520 525
- Lys Ile Ala Ile Glu Ser Ile Val Ile Trp Gly Lys Thr Pro Lys Phe 530 540
- Arg Leu Pro Ile Gln Lys Glu Thr Trp Glu Thr Trp Trp Thr Glu Tyr 545 550 555 560

Trp Gln Ala	Thr Trp 565	Ile Pro	Glu	Trp	Glu 570	Phe	Val	Asn	Thr	Pro 575	Pro
Leu Val Lys	Leu Trp 580	Tyr Glr	Leu	Glu 585	Thr	Glu	Pro	Ile	Ala 590	Gly	Ala
Glu Thr Phe 595	-	Asp Gly	Ala 600	Ala	Asn	Arg	Glu	Thr 605	Lys	Leu	Gly
Lys Ala Gly 610	Tyr Val	Thr Asp	_	Gly	Arg	Gln	Lys 620	Ile	Val	Ser	Leu
Thr Glu Thr 625	Thr Asn	Gln Lys 630	Thr	Glu	Leu	His 635	Ala	Ile	Tyr	Leu	Ala 640
Leu Gln Asp	Ser Gly 645	Leu Glu	ı Val	Asn	Ile 650	Val	Thr	Asp	Ser	Gln 655	Tyr
Ala Leu Gly	Ile Ile 660	Gln Ala	Gln	Pro 665	Asp	Arg	Ser	Glu	Ser 670	Glu	Leu
Val Asn Gln 675		Glu Lys	680	Ile	Glu	Lys	Glu	Arg 685	Val	Tyr	Leu
Ser Trp Val 690	Pro Ala	His Lys	_	Ile	Gly	Gly	Asn 700	Glu	Gln	Val	Asp
Lys Leu Val 705	Ser Ser	Gly Ile 710	e Arg	Lys	Val	Leu 715	Phe	Leu	Asp	Gly	Ile 720
Asp Lys Ala	Gln Glu 725	Glu His	Glu	Arg	Tyr 730	His	Ser	Asn	Trp	Arg 735	Ala
Met Ala His	Asp Phe	Asn Leu	Pro	Pro 745	Ile	Val	Ala	Lys	Glu 750	Ile	Val
Ala Ser Cys 755		Cys Glr	1 Leu 760	Lys	Gly	Glu	Ala	Met 765	His	Gly	Gln
Val Asp Cys 770	Ser Pro	Gly Ile 775	_	Gln	Leu	Asp	Cys 780	Thr	His	Leu	Glu
Gly Lys Val 785	Ile Leu	Val Ala 790	. Val	His	Val	Ala 795	Ser	Gly	Tyr	Ile	Glu 800
Ala Glu Val	Ile Pro 805		Thr	Gly	Gln 810	Glu	Thr	Ala	Tyr	Phe 815	Ile
Leu Lys Leu	Ala Gly 820	Arg Tr) Pro	Val 825	Lys	Val	Ile	His	Thr 830	Asp	Asn
Gly Pro Asn 835		Ser Ala	840	Val	Lys	Ala	Ala	Cys 845	Trp	Trp	Ala
Gly Val Gln 850	Gln Glu	Phe Gly 855		Pro	Tyr	Asn	Pro 860	Gln	Ser	Gln	Gly

- Val Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val 865 870 875 880
- Arg Asp Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe 885 890 895
- Ile His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly 900 905 910
- Glu Arg Ile Ile Asp Ile Ile Ala Thr Asp Ile Gln Thr Lys Glu Leu 915 920 925
- Gln Lys Gln Ile Ile Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp 930 935 940
- Ser Arg Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly 945 950 955 960
- Glu Gly Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro 965 970 975
- Arg Arg Lys Ala Lys Ile Ile Arg Asp Tyr Gly Lys Gln Met Ala Gly 980 985 990
- Asp Asp Cys Val Ala Gly Arg Gln Asp Glu Asp 995 1000

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<212> PRT

<213> Human immunodeficiency virus

<400> 223

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- Ser Ser Glu Gln Thr Arg Ala Asn Ser Pro Thr Arg Arg Glu Leu Gln 20 25 30
- Val Trp Gly Arg Asp Asn Asn Ser Leu Ser Glu Ala Gly Ala Asp Arg 35 40 45
- Gln Gly Thr Val Ser Phe Ser Phe Pro Gln Ile Thr Leu Trp Gln Arg
 50 55 60
- Pro Leu Val Thr Ile Lys Ile Gly Gly Gln Leu Lys Glu Ala Leu Leu 65 70 75 80
- Asp Thr Gly Ala Asp Asp Thr Val Leu Glu Glu Met Asn Leu Pro Gly
 85 90 95
- Arg Trp Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val 100 105 110
- Arg Gln Tyr Asp Gln Ile Leu Ile Glu Ile Cys Gly His Lys Ala Ile

Gly	Thr 130	Val	Leu	Val	Gly	Pro 135	Thr	Pro	Val	Asn	Ile 140	Ile	Gly	Arg	Asn
Leu 145	Leu	Thr	Gln	Ile	Gly 150	Cys	Thr	Leu	Asn	Phe 155	Pro	Ile	Ser	Pro	Ile 160
Glu	Thr	Val	Pro	Val 165	Lys	Leu	Lys	Pro	Gly 170	Met	Asp	Gly	Pro	Lys 175	Val
Lys	Gln	Trp	Pro 180	Leu	Thr	Glu	Glu	Lys 185	Ile	Lys	Ala	Leu	Val 190	Glu	Ile
Cys	Thr	Glu 195	Met	Glu	Lys	Glu	Gly 200	Lys	Ile	Ser	Lys	Ile 205	Gly	Pro	Glu
Asn	Pro 210	Tyr	Asn	Thr	Pro	Val 215	Phe	Ala	Ile	Lys	Lys 220	Lys	Asp	Ser	Thr
Lys 225	Trp	Arg	Lys	Leu	Val 230	Asp	Phe	Arg	Glu	Leu 235	Asn	Lys	Arg	Thr	Gln 240
Asp	Phe	Trp	Glu	Val 245	Gln	Leu	Gly	Ile	Pro 250	His	Pro	Ala	Gly	Leu 255	Lys
Lys	Lys	Lys	Ser 260	Val	Thr	Val	Leu	Asp 265	Val	Gly	Asp	Ala	Tyr 270	Phe	Ser
Val	Pro	Leu 275	Asp	Lys	Asp	Phe	Arg 280	Lys	Tyr	Thr	Ala	Phe 285	Thr	Ile	Pro
Ser	Ile 290	Asn	Asn	Glu	Thr	Pro 295	Gly	Ile	Arg	Tyr	Gln 300	Tyr	Asn	Val	Leu
Pro 305	Gln	Gly	Trp	Lys	Gly 310	Ser	Pro	Ala	Ile	Phe 315	Gln	Ser	Ser	Met	Thr 320
Lys	Ile	Leu	Glu	Pro 325	Phe	Arg	Lys	Gln	Asn 330	Pro	Asp	Ile	Val	Ile 335	Tyr
Gln	Tyr	Met	Asp 340	Asp	Leu	Tyr	Val	Gly 345	Ser	Asp	Leu	Glu	Ile 350	Gly	Gln
His	Arg	Thr 355	Lys	Ile	Glu	Glu	Leu 360	Arg	Gln	His	Leu	Leu 365	Arg	Trp	Gly
Phe	Thr 370	Thr	Pro	Asp	Lys	Lys 375	His	Gln	Lys	Glu	Pro 380	Pro	Phe	Leu	Trp
Met 385	Gly	Tyr	Glu	Leu	His 390	Pro	Asp	Lys	Trp	Thr 395	Val	Gln	Pro	Ile	Val 400
Leu	Pro	Glu	Lys	Asp 405	Ser	Trp	Thr	Val	Asn 410	Asp	Ile	Gln	Lys	Leu 415	Val
G132	Larc	Len	Acr	Trr	Δla	Car	Glr	Tle	ጥነሪው	Δla	Clar	Tle	Laze	1/2 T	Laze

Gln Leu Cys Lys Leu Leu Arq Gly Thr Lys Ala Leu Thr Glu Val Ile Pro Leu Thr Glu Glu Ala Glu Leu Glu Leu Ala Glu Asn Arg Glu Ile Leu Lys Glu Pro Val His Gly Val Tyr Tyr Asp Pro Ser Lys Asp Leu 475 Ile Ala Glu Ile Gln Lys Gln Gly Gln Gly Gln Trp Thr Tyr Gln Ile 485 490 Tyr Gln Glu Pro Phe Lys Asn Leu Lys Thr Gly Lys Tyr Ala Arg Met 505 Arg Gly Ala His Thr Asn Asp Val Lys Gln Leu Thr Glu Ala Val Gln 515 520 Lys Ile Ala Thr Glu Ser Ile Val Ile Trp Gly Lys Thr Pro Lys Phe 535 Lys Leu Pro Ile Gln Lys Glu Thr Trp Glu Ala Trp Trp Thr Glu Tyr 555 550 Trp Gln Ala Thr Trp Ile Pro Glu Trp Glu Phe Val Asn Thr Pro Pro Leu Val Lys Leu Trp Tyr Gln Leu Glu Lys Glu Pro Ile Val Gly Ala Glu Thr Phe Tyr Val Asp Gly Ala Ala Asn Arg Glu Thr Lys Leu Gly 595 600 Lys Ala Gly Tyr Val Thr Asp Arg Gly Arg Gln Lys Val Val Ser Leu 615 Thr Asp Thr Thr Asn Gln Lys Thr Glu Leu Gln Ala Ile His Leu Ala 630 635 Leu Gln Asp Ser Gly Leu Glu Val Asn Ile Val Thr Asp Ser Gln Tyr 645 Ala Leu Gly Ile Ile Gln Ala Gln Pro Asp Lys Ser Glu Ser Glu Leu Val Ser Gln Ile Ile Glu Gln Leu Ile Lys Lys Glu Lys Val Tyr Leu Ala Trp Val Pro Ala His Lys Gly Ile Gly Gly Asn Glu Gln Val Asp 690 Lys Leu Val Ser Ala Gly Ile Arg Lys Val Leu Phe Leu Asp Gly Ile 715 Asp Lys Ala Gln Glu Glu His Glu Lys Tyr His Ser Asn Trp Arg Ala 725 730 735

Met Ala Ser Asp Phe Asn Leu Pro Pro Val Val Ala Lys Glu Ile Val
740 745 750

Ala Ser Cys Asp Lys Cys Gln Leu Lys Gly Glu Ala Met His Gly Gln 755 760 765

Val Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu
770 780

Gly Lys Ile Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu 785 790 795 800

Ala Glu Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Leu 805 810 815

Leu Lys Leu Ala Gly Arg Trp Pro Val Lys Thr Ile His Thr Asp Asn 820 825 830

Gly Ser Asn Phe Thr Ser Thr Thr Val Lys Ala Ala Cys Trp Trp Ala 835 840 845

Gly Ile Lys Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly 850 855 860

Val Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val 865 870 875 880

Arg Asp Gln Ala Glu His Leu Lys Thr Ala Val Ġln Met Ala Val Phe 885 890 895

Ile His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly 900 905 910

Glu Arg Ile Val Asp Ile Ile Ala Thr Asp Ile Gln Thr Lys Glu Leu 915 920 925

Gln Lys Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp 930 935 940

Ser Arg Asp Pro Leu Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly 945 950 955 960

Glu Gly Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro 965 970 975

Arg Arg Lys Ala Lys Ile Ile Arg Asp Tyr Gly Lys Gln Met Ala Gly 980 985 990

Asp Asp Cys Val Ala Ser Arg Gln Asp Glu Asp 995 1000

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<212> DNA

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<213> Human immunodeficiency virus

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Val Trp Gly Arg Asp Asn Asn Pro Leu Ser Glu Ala Gly Ala Asp Arg 35 40 45

Gln Gly Thr Val Ser Phe Ser Phe Pro Gln Ile Thr Leu Trp Gln Arg
50 55 60

Pro Leu Val Thr Ile Lys Ile Gly Gly Gln Leu Lys Glu Ala Leu Leu 65 70 75 80

Asp Thr Gly Ala Asp Asp Thr Val Leu Glu Glu Met Asn Leu Pro Gly 85 90 95

Lys Trp Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val

Arg Gln Tyr Asp Gln Ile Leu Ile Glu Ile Cys Gly His Lys Ala Ile 115 120 125

Gly Thr Val Leu Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn 130 135 140

Leu Leu Thr Gln Ile Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile 145 150 155 160

Glu Thr Val Pro Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val 165 170 175

Lys Gln Trp Pro Leu Thr Glu Glu Lys Ile Lys Ala Leu Val Glu Ile 180 185 190

Cys Thr Glu Met Glu Lys Glu Gly Lys Ile Ser Lys Ile Gly Pro Glu 195 200 205

Asn Pro Tyr Asn Thr Pro Val Phe Ala Ile Lys Lys Lys Asp Ser Thr 210 215 220

Lys Trp Arg Lys Leu Val Asp Phe Arg Glu Leu Asn Lys Arg Thr Gln 225 230 235 240

Asp Phe Trp Glu Val Gln Leu Gly Ile Pro His Pro Ala Gly Leu Lys 245 250 255

Lys Lys Lys Ser Val Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser 260 265 270

Val	Pro	Leu 275	Asp	Lys	Asp	Phe	Arg 280	Lys	Tyr	Thr	Ala	Phe 285	Thr	Ile	Pro
Ser	Ile 290	Asn	Asn	Glu	Thr	Pro 295	Gly	Ile	Arg	Tyr	Gln 300	Tyr	Asn	Val	Leu
Pro 305	Gln	Gly	Trp	Lys	Gly 310	Ser	Pro	Ala	Ile	Phe 315	Gln	Ser	Ser	Met	Thr 320
Lys	Ile	Leu	Glu	Pro 325	Phe	Arg	Lys	Gln	Asn 330	Pro	Glu	Ile	Val	Ile 335	Tyr
Gln	Tyr	Met	Asp 340	Asp	Leu	Tyr	Val	Gly 345	Ser	Asp	Leu	Glu	Ile 350	Gly	Gln
His	Arg	Thr 355	Lys	Ile	Glu	Glu	Leu 360	Arg	Glu	His	Leu	Leu 365	Arg	Trp	Gly
Phe	Thr 370	Thr	Pro	Asp	Lys	Lys 375	His	Gln	Lys	Glu	Pro 380	Pro	Phe	Leu	Trp
Met 385	Gly	Tyr	Glu	Leu	His 390	Pro	Asp	Lys	Trp	Thr 395	Val	Gln	Pro	Ile	Val 400
Leu	Pro	Glu	Lys	Asp 405	Ser	Trp	Thr	Val	Asn 410	Asp	Ile	Gln	Lys	Leu 415	Val
Gly	Lys	Leu	Asn 420	Trp	Ala	Ser	Gln	Ile 425	Tyr	Ala	Gly	Ile	Lys 430	Val	Lys
Gln	Leu	Cys 435	Lys	Leu	Leu	Arg	Gly 440	Thr	Lys	Ala	Leu	Thr 445	Glu	Val	Val
Pro	Leu 450	Thr	Glu	Glu	Ala	Glu 455	Leu	Glu	Leu	Ala	Glu 460	Asn	Arg	Glu	Ile
Leu 465	Lys	Glu	Pro	Val	His 470	Gly	Val	Tyr	Tyr	Asp 475	Pro	Ser	Lys	Asp	Leu 480
Ile	Ala	Glu	Ile	Gln 485	Lys	Gln	Gly	Gln	Gly 490	Gln	Trp	Thr	Tyr	Gln 495	Ile
Tyr	Gln	Glu	Pro 500	Phe	Lys	Asn	Leu	Lys 505	Thr	Gly	Lys	Tyr	Ala 510	Arg	Met
Arg	Gly	Ala 515	His	Thr	Asn	Asp	Val 520	Lys	Gln	Leu	Thr	Glu 525	Ala	Val	Gln
Lys	Ile 530	Ala	Thr	Glu	Ser	Ile 535	Val	Ile	Trp	Gly	Lys 540	Thr	Pro	Lys	Phe
Lys 545	Leu	Pro	Ile	Gln	Lys 550	Glu	Thr	Trp	Glu	Ala 555	Trp	Trp	Thr	Glu	Tyr 560
Trp	Gln	Ala	Thr	Trp 565	Ile	Pro	Glu	Trp	Glu 570	Phe	Val	Asn	Thr	Pro 575	Pro

- Leu Val Lys Leu Trp Tyr Gln Leu Glu Lys Glu Pro Ile Val Gly Ala S90 Glu Thr Phe Tyr Val Asp Gly Ala Asn Arg Glu Thr Lys Leu Gly 600 Ala Gly Arg Gln Lys Val Val Ser Leu Gly 610 Asp Thr Asn Gln Lys Thr Glu Leu Gln Ala Ile His Leu Ala 640 Ala Leu Gln Asp Ser Gly Leu Glu Val Asn Ile Val Thr Asp Ser Gln Tyr 655 Ala Leu Gly Ile Ile Gln Ala Gln Pro Asp Lys Ser Glu Ser Glu Leu
- 660 665 670
- Val Ser Gln Ile Ile Glu Gln Leu Ile Lys Lys Glu Lys Val Tyr Leu 675 680 685
- Ala Trp Val Pro Ala His Lys Gly Ile Gly Gly Asn Glu Gln Val Asp 690 695 700
- Lys Leu Val Ser Ala Gly Ile Arg Lys Val Leu Phe Leu Asp Gly Ile 705 710 715 720
- Asp Lys Ala Gln Glu Glu His Glu Lys Tyr His Ser Asn Trp Arg Ala 725 730 735
- Met Ala Ser Asp Phe Asn Leu Pro Pro Val Val Ala Lys Glu Ile Val 740 745 750
- Ala Ser Cys Asp Lys Cys Gln Leu Lys Gly Glu Ala Met His Gly Gln
 755 760 765
- Val Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu 770 775 780
- Gly Lys Ile Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu 785 790 795 800
- Ala Glu Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Ile 805 810 815
- Leu Lys Leu Ala Gly Arg Trp Pro Val Lys Val Ile His Thr Asp Asn 820 825 830
- Gly Ser Asn Phe Thr Ser Thr Thr Val Lys Ala Ala Cys Trp Trp Ala 835 840 845
- . Gly Ile Lys Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly 850 855 860
 - Val Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val 865 870 875 880

Arg Asp Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe 885 Ile His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly 900 905 910 Glu Arg Ile Val Asp Ile Ile Ala Thr Asp Ile Gln Thr Lys Glu Leu 920 Gln Lys Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp 935 940 Ser Arg Asp Pro Leu Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly 955 960 945 950 Glu Gly Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro 965 970 Arg Arg Lys Ala Lys Ile Ile Arg Asp Tyr Gly Lys Gln Met Ala Gly 985

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<213> Human immunodeficiency virus
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                                  25
Val Arg Gly Asp Asn Pro Arg Ser Glu Ala Gly Ala Glu Arg Gln Gly
                             40
Thr Leu Asn Phe Pro Gln Ile Thr Leu Trp Gln Arg Pro Leu Val Ser
     50
Ile Lys Val Gly Gly Gln Ile Lys Glu Ala Leu Leu Asp Thr Gly Ala
Asp Asp Thr Val Leu Glu Glu Ile Asn Leu Pro Gly Lys Trp Lys Pro
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Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val Arg Gln Tyr Asp 105

Gln Ile Leu Ile Glu Ile Cys Gly Lys Lys Ala Ile Gly Thr Val Leu 120

100

115

90

110

Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn Met Leu Thr Gln 135 Leu Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile Glu Thr Val Pro 145 155 Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val Lys Gln Trp Pro Leu Thr Glu Glu Lys Ile Lys Ala Leu Thr Ala Ile Cys Glu Glu Met 185 Glu Lys Glu Gly Lys Ile Thr Lys Ile Gly Pro Glu Asn Pro Tyr Asn 195 Thr Pro Val Phe Ala Ile Lys Lys Lys Asp Ser Thr Lys Trp Arg Lys Leu Val Asp Phe Arg Glu Leu Asn Lys Arg Thr Gln Asp Phe Trp Glu 235 Val Gln Leu Gly Ile Pro His Pro Ala Gly Leu Lys Lys Lys Ser Val Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser Val Pro Leu Asp 265 Glu Gly Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro Ser Ile Asn Asn 280 275 Glu Thr Pro Gly Ile Arg Tyr Gln Tyr Asn Val Leu Pro Gln Gly Trp Lys Gly Ser Pro Ala Ile Phe Gln Ser Ser Met Thr Lys Ile Leu Glu 315 310 Pro Phe Arg Ala Gln Asn Pro Glu Ile Val Ile Tyr Gln Tyr Met Asp 325 Asp Leu Tyr Val Gly Ser Asp Leu Glu Ile Gly Gln His Arg Ala Lys Ile Glu Glu Leu Arg Glu His Leu Leu Lys Trp Gly Phe Thr Thr Pro Asp Lys Lys His Gln Lys Glu Pro Pro Phe Leu Trp Met Gly Tyr Glu Leu His Pro Asp Lys Trp Thr Val Gln Pro Ile Gln Leu Pro Glu Lys 390 395 Asp Ser Trp Thr Val Asn Asp Ile Gln Lys Leu Val Gly Lys Leu Asn 405 Trp Ala Ser Gln Ile Tyr Pro Gly Ile Lys Val Arg Gln Leu Cys Lys

425

Leu	Leu	Arg 435	Gly	Ala	Lys	Ala	Leu 440	Thr	Asp	Ile	Val	Pro 445	Leu	Thr	Glu
Glu	Ala 450	Glu	Leu	Glu	Leu	Ala 455	Glu	Asn	Arg	Glu	Ile 460	Leu	Lys	Glu	Pro
Val 465	His	Gly	Val	Tyr	Tyr 470	Asp	Pro	Ser	Lys	Asp 475	Leu	Ile	Ala	Glu	Ile 480
Gln	Lys	Gln	Gly	His 485	Asp	Gln	Trp	Thr	Tyr 490	Gln	Ile	Tyr	Gln	Glu 495	Pro
Phe	Lys	Asn	Leu 500	Lys	Thr	Gly	Lys	Tyr 505	Ala	Lys	Met	Arg	Thr 510	Ala	His
Thr	Asn	Asp 515	Val	Lys	Gln	Leu	Thr 520	Glu	Ala	Val	Gln	Lys 525	Ile	Ala	Met
Glu	Ser 530	Ile	Val	Ile	Trp	Gly 535	Lys	Thr	Pro	Lys	Phe 540	Arg	Leu	Pro	Ile
Gln 545	Lys	Glu	Thr	Trp	Glu 550	Thr	Trp	Trp	Thr	Asp 555	Tyr	Trp	Gln	Ala	Thr 560
Trp	Ile	Pro	Glu	Trp 565	Glu	Phe	Val	Asn	Thr 570	Pro	Pro	Leu	Val	Lys 575	Leu
Trp	Tyr	Gln	Leu 580	Glu	Lys	Glu	Pro	Ile 585	Ala	Gly	Ala	Glu	Thr 590	Phe	Tyr
Val	Asp	Gly 595	Ala	Ala	Asn	Arg	Glu 600	Thr	Lys	Ile	Gly	Lys 605	Ala	Gly	Tyr
Val	Thr 610	Asp	Arg	Gly	Arg	Gln 615	Lys	Ile	Val	Ser	Leu 620	Thr	Glu	Thr	Thr
Asn 625	Gln	Lys	Thr	Glu	Leu 630	Gļn	Ala	Ile	Gln	Leu 635	Ala	Leu	Gln	Asp	Ser 640
Gly	Ser	Glu	Val	Asn 645	Ile	Val	Thr	Asp	Ser 650	Gln	Tyr	Ala	Leu	Gly 655	Ile
Ile	Gln	Ala	Gln 660	Pro	Asp	Lys	Ser	Glu 665	Ser	Glu	Leu	Val	Asn 670	Gln	Ile
Ile	Glu	Gln 675	Leu	Ile	Lys	Lys	Glu 680	Arg	Val	Tyr	Leu	Ser 685	Trp	Val	Pro
Ala	His 690	Lys	Gly	Ile	Gly	Gly 695	Asn	Glu	Gln	Val	Asp 700	Lys	Leu	Val	Ser
Ser 705	Gly	Ile	Arg	Lys	Val 710	Leu	Phe	Leu	Asp	Gly 715	Ile	Asp	Lys	Ala	Gln 720
Glu	Glu	His	Glu	Lys 725	Tyr	His	Ser	Asn	Trp 730	Arg	Ala	Met	Ala	Ser 735	Glu

Phe Asn Leu Pro Pro Ile Val Ala Lys Glu Ile Val Ala Ser Cys Asp 740 745 750

Lys Cys Gln Leu Lys Gly Glu Ala Ile His Gly Gln Val Asp Cys Ser 755 760 765

Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu Gly Lys Ile Ile 770 780

Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu Ala Glu Val Ile 785 790 795 800

Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Tyr Ile Leu Lys Leu Ala 805 810 815

Gly Arg Trp Pro Val Lys Val Ile His Thr Asp Asn Gly Ser Asn Phe 820 825 830

Thr Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala Gly Ile Gln Gln 835 840 845

Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly Val Val Glu Ser 850 855 860

Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val Arg Asp Gln Ala 865 870 875 880

Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe Ile His Asn Phe 885 890 895

Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly Glu Arg Ile Ile 900 905 910

Asp Ile Ile Ala Thr Asp Ile Gln Thr Lys Glu Leu Gln Lys Gln Ile 915 920 925

Ile Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp Ser Arg Asp Pro 930 935 940

Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly Glu Gly Ala Val 945 950 955 960

Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro Arg Arg Lys Ala 965 970 975

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Ala Gly Arg Gln Asp Glu Asp 995

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<211> 3000

<212> DNA

<213> Human immunodeficiency virus

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					ggactccacc	
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<212> PRT

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Thr Leu Thr Leu Asn Phe Pro Gln Ile Thr Leu Trp Gln Arg Pro Leu 50 55 60

Val Ser Ile Lys Val Gly Gly Gln Ile Lys Glu Ala Leu Leu Asp Thr 65 70 75 80

Gly Ala Asp Asp Thr Val Leu Glu Glu Ile Asn Leu Pro Gly Lys Trp 85 90 95

Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val Arg Gln 100 $\,$ 105 $\,$ 110

Tyr Asp Gln Ile Leu Ile Glu Ile Cys Gly Lys Lys Ala Ile Gly Thr 115 120 125

Val Leu Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn Met Leu 130 135 140

Thr Gln Leu Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile Glu Thr
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Val Pro Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val Lys Gln

Trp Pro Leu Thr Glu Glu Lys Ile Lys Ala Leu Thr Ala Ile Cys Glu 180 185 190

Glu Met Glu Lys Glu Gly Lys Ile Thr Lys Ile Gly Pro Glu Asn Pro 195 200 205

Tyr Asn Thr Pro Val Phe Ala Ile Lys Lys Lys Asp Ser Thr Lys Trp 210 215 220

Arg Lys Leu Val Asp Phe Arg Glu Leu Asn Lys Arg Thr Gln Asp Phe 225 230 235 240

Trp Glu Val Gln Leu Gly Ile Pro His Pro Ala Gly Leu Lys Lys Lys 255

Lys Ser Val Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser Val Pro 260 265 270

Leu Asp Glu Gly Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro Ser Ile 275 280 285

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Leu Glu Pro	Phe Arg 325		Asn	Pro	Glu 330	Ile	Val	Ile	Tyr	Gln 335	Tyr
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Ala Lys Ile 355		Leu Arg	Glu 360	His	Leu	Leu	Lys	Trp 365	Gly	Phe	Thr
Thr Pro Asp	Lys Lys	His Gln 375		Glu	Pro	Pro	Phe 380	Leu	Trp	Met	Gly
Tyr Glu Leu 385	His Pro	Asp Lys	Trp	Thr	Val	Gln 395	Pro	Ile	Gln	Leu	Pro 400
Glu Lys Asp	Ser Trp 405		Asn	Asp	Ile 410	Gln	Lys	Leu	Val	Gly 415	Lys
Leu Asn Trp	Ala Ser 420	Gln Ile	Tyr	Pro 425	Gly	Ile	Lys	Val	Arg 430	Gln	Leu
Cys Lys Leu 435	_	Gly Ala	Lys 440	Ala	Leu	Thr	Asp	Ile 445	Val	Pro	Leu
Thr Glu Glu 450	Ala Glu	Leu Glu 455		Ala	Glu	Asn	Arg 460	Glu	Ile	Leu	Lys
Glu Pro Val 465	His Gly	Val Tyr 470	Tyr	Asp	Pro	Ser 475	Lys	Asp	Leu	Ile	Ala 480
Glu Ile Glr	Lys Gln 485	=	Asp	Gln	Trp 490	Thr	Tyr	Gln	Ile	Tyr 495	Gln
Glu Pro Phe	Lys Asn 500	Leu Lys	Thr	Gly 505	Lys	Tyr	Ala	Lys	Met 510	Arg	Thr
Ala His Thr 515		Val Lys	Gln 520	Leu	Thr	Glu	Ala	Val 525	Gln	Lys	Ile
Ala Met Glu 530	Ser Ile	Val Ile		Gly	Lys	Thr	Pro 540	Lys	Phe	Arg	Leu
Pro Ile Glr 545	Lys Glu	Thr Trp 550	Glu	Thr	Trp	Trp 555	Thr	Asp	Tyr	Trp	Gln 560
Ala Thr Trp	Ile Pro 565		Glu	Phe	Val 570	Asn	Thr	Pro	Pro	Leu 575	Val
Lys Leu Trp	Tyr Gln 580	Leu Glu	Lys	Glu 585	Pro	Ile	Ala	Gly	Ala 590	Glu	Thr

- Phe Tyr Val Asp Gly Ala Ala Asn Arg Glu Thr Lys Ile Gly Lys Ala
 595 600 605
- Gly Tyr Val Thr Asp Arg Gly Arg Gln Lys Ile Val Ser Leu Thr Glu 610 620
- Thr Thr Asn Gln Lys Thr Glu Leu Gln Ala Ile Gln Leu Ala Leu Gln 625 630 635 640
- Asp Ser Gly Ser Glu Val Asn Ile Val Thr Asp Ser Gln Tyr Ala Leu 645 650 655
- Gly Ile Ile Gln Ala Gln Pro Asp Lys Ser Glu Ser Glu Leu Val Asn 660 665 670
- Gln Ile Ile Glu Gln Leu Ile Lys Lys Glu Lys Val Tyr Leu Ser Trp 675 680 685
- Val Pro Ala His Lys Gly Ile Gly Gly Asn Glu Gln Val Asp Lys Leu 690 695 700
- Val Ser Ser Gly Ile Arg Lys Val Leu Phe Leu Asp Gly Ile Asp Lys 705 710 715 720
- Ala Gln Glu Glu His Glu Lys Tyr His Ser Asn Trp Arg Ala Met Ala 725 730 735
- Ser Glu Phe Asn Leu Pro Pro Ile Val Ala Lys Glu Ile Val Ala Ser 740 745 750
- Cys Asp Lys Cys Gln Leu Lys Gly Glu Ala Met His Gly Gln Val Asp
 755 760 765
- Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu Gly Lys
- Ile Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu Ala Glu 785 790 795 800
- Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Ile Leu Lys 805 810 815
- Leu Ala Gly Arg Trp Pro Val Lys Val Ile His Thr Asp Asn Gly Ser 820 825 830
- Asn Phe Thr Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala Gly Ile 835 840 845
- Gln Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly Val Val 850 855 860
- Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val Arg Asp 865 870 875 880
- Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe Ile His 885 890 895

Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly Glu Arg 900 905 910

Ile Ile Asp Ile Ile Ala Thr Asp Ile Gln Thr Lys Glu Leu Gln Lys 915 920 925

Gln Ile Ile Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp Ser Arg 930 935 940

Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly Glu Gly 945 950 955 960

Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro Arg Arg 965 970 975

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Cys Val Ala Gly Arg Gln Asp Glu Asp 995 1000

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<211> 3006

<212> DNA

<213> Human immunodeficiency virus

<400> 231

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<210> 232
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<211> 1002

<212> PRT

<213> Human immunodeficiency virus

<400> 232

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35 40 45

Gly Thr Val Ser Phe Asn Phe Pro Gln Ile Thr Leu Trp Gln Arg Pro 50 55 60

Leu Val Thr Ile Lys Ile Gly Gly Gln Leu Lys Glu Ala Leu Leu Asp 65 70 75 80

Thr Gly Ala Asp Asp Thr Val Leu Glu Glu Ile Asn Leu Pro Gly Lys
85 90 95

Trp Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val Arg
100 105 110

Gln Tyr Asp Gln Ile Leu Ile Glu Ile Cys Gly His Lys Ala Ile Gly
115 120 125

Thr Val Leu Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn Leu
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	Thr	Glu	Met 195	Glu	Lys	Glu	Gly	Lys 200	Ile	Ser	Arg	Ile	Gly 205	Pro	Glu	Asn
,	Pro	Tyr 210	Asn	Thr	Pro	Ile	Phe 215	Ala	Ile	Lys	Lys	Lys 220	Asp	Ser	Thr	Lys
	Trp 225	Arg	Lys	Leu	Val	Asp 230	Phe	Arg	Glu	Leu	Asn 235	Lys	Arg	Thr	Gln	Asp 240
	Phe	Trp	Glu	Val	Gln 245	Leu	Gly	Ile	Pro	His 250	Pro	Ala	Gly	Leu	Lys 255	Lys
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Lys 465	Glu	Pro	Val	His	Gly 470	Val	Tyr	Tyr	Asp	Pro 475	Ser	Lys	Asp	Leu	Ile 480
Ala	Glu	Ile	Gln	Lys 485	Gln	Gly	Gln	Gly	Gln 490	Trp	Thr	Tyr	Gln	Ile 495	Tyr
Gln	Glu	Pro	Phe 500	Lys	Asn	Leu	Lys	Thr 505	Gly	Lys	Tyr	Ala	Arg 510	Met	Arg
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Leu 545	Pro	Ile	Gln	Lys	Glu 550	Thr	Trp	Glu	Thr	Trp 555	Trp	Thr	Glu	Tyr	Trp 560
Gln	Ala	Thr	Trp	Ile 565	Pro	Glu	Trp	Glu	Phe 570	Val	Asn	Thr	Pro	Pro 575	Leu
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Ala	Gly 610	Tyr	Val	Thr	Asp	Arg 615	Gly	Arg	Gln	Lys	Val 620	Val	Pro	Leu	Thr
Asp 625	Thr	Thr	Asn	Gln	Lys 630	Thr	Glu	Leu	Gln	Ala 635	Ile	Asn	Leu	Ala	Leu 640
Gln	Asp	Ser	Gly	Leu 645	Glu	Val	Asn	Ile	Val 650	Thr	Asp	Ser	Gln	Tyr 655	Ala
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Ser	Gln	Ile 675	Ile	Glu	Gln	Leu	Ile 680	Lys	Lys	Glu	Lys	Val 685	Tyr	Leu	Ala
Trp	Val 690	Pro	Ala	His	Lys	Gly 695	Ile	Gly	Gly	Asn	Glu 700	Gln	Val	Asp	Lys
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Lys	Ala	Gln	Glu	Glu 725	His	Glu	Lys	Tyr	His 730	Asn	Asn	Trp	Arg	Ala 735	Met
Ala	Ser	Asp	Phe 740	Asn	Leu	Pro	Pro	Val 745	Val	Ala	Lys	Glu	Ile 750	Val	Ala

Ser Cys Asp Lys Cys Gln Leu Lys Gly Glu Ala Met His Gly Gln Val

Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu Gly 770 780

Lys Val Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu Ala 785 790 795 800

Glu Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Leu Leu 805 810 815

Lys Leu Ala Gly Arg Trp Pro Val Lys Val Val His Thr Asp Asn Gly 820 825 830

Ser Asn Phe Thr Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala Gly 835 840 845

Ile Lys Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly Val 850 855 860

Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val Arg 865 870 875 880

Asp Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe Ile 885 890 895

His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly Glu 900 905 910

Arg Ile Ile Asp Ile Ile Ala Thr Asp Ile Gln Thr Lys Glu Leu Gln 915 920 925

Lys Gln Ile Ile Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp Ser

Arg Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly Glu 945 950 955 960

Gly Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro Arg 965 970 975

Arg Lys Val Lys Ile Ile Arg Asp Tyr Gly Lys Gln Met Ala Gly Asp 980 985 990

Asp Cys Val Ala Ser Arg Gln Asp Glu Asp 995 1000

<210> 233

<211> 1003

<212> PRT

<213> Human immunodeficiency virus

<400> 233

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 35 40 45
- Gly Thr Val Pro Ser Leu Ser Phe Pro Gln Ile Thr Leu Trp Gln Arg
 50 55 60
- Pro Leu Val Thr Ile Lys Ile Gly Gly Gln Leu Lys Glu Ala Leu Leu 65 70 75 80
- Asp Thr Gly Ala Asp Asp Thr Val Leu Glu Asp Ile Asn Leu Pro Gly 85 90 95
- Lys Trp Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val
- Lys Gln Tyr Asp His Ile Leu Ile Glu Ile Cys Gly His Lys Ala Ile 115 120 125
- Gly Thr Val Leu Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn 130 135 140
- Met Leu Thr Gln Ile Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile 145 150 155 160
- Glu Thr Val Pro Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val
- Lys Gln Trp Pro Leu Thr Glu Glu Lys Ile Lys Ala Leu Thr Glu Ile 180 185 190
- Cys Thr Glu Met Glu Lys Glu Gly Lys Ile Ser Lys Ile Gly Pro Glu 195 200 205
- Asn Pro Tyr Asn Thr Pro Val Phe Ala Ile Lys Lys Lys Asp Ser Thr 210 215 220
- Lys Trp Arg Lys Leu Val Asp Phe Arg Glu Leu Asn Lys Arg Thr Gln 225 230 235 240
- Asp Phe Trp Glu Val Gln Leu Gly Ile Pro His Pro Ala Gly Leu Lys 245 250 255
- Lys Lys Ser Val Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser 260 265 270
- Val Pro Leu Asp Lys Asp Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro 275 280 285
- Ser Val Asn Asn Glu Thr Pro Gly Ile Arg Tyr Gln Tyr Asn Val Leu 290 295 300
- Pro Gln Gly Trp Lys Gly Ser Pro Ala Ile Phe Gln Cys Ser Met Thr 305 310 315 320

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Thr 625	Glu	Thr	Thr	Asn	Gln 630	Lys	Ala	Glu	Leu	Gln 635	Ala	Ile	His	Leu	Ala 640
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Ala	Leu	Gly	Ile 660	Ile	Gln	Ala	Gln	Pro 665	Asp	Lys	Ser	Glu	Ser 670	Glu	Leu
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Asp	Lys	Ala	Gln	Glu 725	Glu	His	Glu	Lys	Tyr 730	His	Asn	Asn	Trp	Arg 735	Ala
Met	Ala	Ser	Asp 740	Phe	Asn	Leu	Pro	Pro 745	Val	Val	Ala	Lys	Glu 750	Ile	Val
Ala	Ser	Cys 755	Asp	Lys	Cys	Gln	Leu 760	Lys	Gly	Glu	Ala	Met 765	His	Gly	Gln
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Gly 785	Lys	Ile	Ile	Leu	Val 790	Ala	Val	His	Val	Ala 795	Ser	Gly	Tyr	Ile	Glu 800
Ala	Glu	Val	Ile	Pro 805	Ala	Glu	Thr	Gly	Gln 810	Glu	Thr	Ala	Tyr	Phe 815	Ile
Leu	Lys	Leu	Ala 820	Gly	Arg	Trp	Pro	Val 825	Lys	Ile	Ile	His	Thr 830	Asp	Asn
Gly	Ser	Asn 835	Phe	Thr	Ser	Ala	Ala 840	Val	Lys	Ala	Ala	Cys 845	Trp	Trp	Ala
Gly	Ile 850	Gln	Gln	Glu	Phe	Gly 855	Ile	Pro	Tyr	Asn	Pro 860	Gln	Ser	Gln	Gly
Val 865	Val	Glu	Ser	Met	Asn 870	Lys	Glu	Leu	Lys	Lys 875	Ile	Ile	Gly	Gln	Val 880
Arg	Asp	Gln	Ala	Glu 885	His	Leu	Lys	Thr	Ala 890	Val	Gln	Met	Ala	Val 895	Phe
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Glu	Arg	Ile 915	Ile	Asp	Ile	Ile	Ala 920	Thr	Asp	Ile	Gln	Thr 925	Arg	Glu	Leu

Gln Lys Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp 930 935 940

Ser Arg Asp Pro Val Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly 945 950 955 960

Glu Gly Ala Val Val Ile Gln Asp Asn Ser Glu Ile Lys Val Val Pro 965 970 975

Arg Arg Lys Ala Lys Ile Ile Arg Asp Tyr Gly Lys Gln Met Ala Gly 980 985 990

Asp Asp Cys Val Ala Gly Arg Gln Asp Glu Asp 995 1000

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Gly Thr Gly Ser Ser Leu Asp Phe Pro Gln Ile Thr Leu Trp Gln Arg
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Pro Leu Val Thr Ile Lys Val Gly Gly Gln Leu Arg Glu Ala Leu Leu
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Asp Thr Gly Ala Asp Asp Thr Val Leu Glu Asp Ile Asn Leu Pro Gly
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Met Leu Thr Gln Ile Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile

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150

115

145

105

110

160

140

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Суз	Thr	Glu 195	Met	Glu	Lys	Glu	Gly 200	Lys	Ile	Ser	Lys	Ile 205	Gly	Pro	Glu	
Asr	Pro 210	Tyr	Asn	Thr	Pro	Val 215	Phe	Ala	Ile	Lys	Lys 220	Lys	Asp	Ser	Thr	
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Asp	Phe	Trp	Glu	Val 245	Gln	Leu	Gly	Ile	Pro 250	His	Pro	Ala	Gly	Leu 255	Lys	
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Ph€	370	Thr	Pro	Asp	Lys	Lys 375	His	Gln	Lys	Glu	Pro 380	Pro	Phe	Leu	Trp	
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His	Leu	Cys 435	Lys	Leu	Leu	Arg	Gly 440	Ala	Lys	Ala	Leu	Thr 445	Asp	Val	Val	
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Glu	Thr	Phe 595	Tyr	Val	Asp	Gly	Ala 600	Ala	Asn	Arg	Glu	Thr 605	Lys	Leu	Gly
Lys	Ala 610	Gly	Tyr	Val	Thr	Asp 615	Arg	Gly	Arg	Gln	Lys 620	Val	Val	Pro	Leu
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Val Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu 770 775 780

Gly Lys Ile Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu 785 790 795 800

Ala Glu Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Ile 805 810 815

Leu Lys Leu Ala Gly Arg Trp Pro Val Lys Ile Ile His Thr Asp Asn 820 825 830

Gly Ser Asn Phe Thr Ser Thr Val Val Lys Ala Ala Cys Trp Trp Ala 835 840 845

Gly Ile Gln Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly 850 855 860

Val Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val 865 870 875 880

Arg Asp Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe 885 890 895

Ile His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly 900 905 910

Glu Arg Ile Ile Asp Ile Ile Ala Thr Asp Ile Gln Thr Lys Glu Leu 915 920 925

Gln Lys Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Phe Arg Asp 930 935 940

Ser Arg Asp Pro Val Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly 945 950 955 960

Glu Gly Ala Val Val Ile Gln Asp Asn Asn Glu Ile Lys Val Val Pro 965 970 975

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<210> 237

<211> 1002

<212> PRT

<213> Human immunodeficiency virus

<400> 237

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Trp	Lys	Pro	Lys 100	Met	Ile	Gly	Gly	Ile 105	Gly	Gly	Phe	Ile	Lys 110	Val	Arg
Gln	Tyr	Asp 115	Gln	Ile	Leu	Ile	Glu 120	Ile	Ser	Gly	Lys	Lys 125	Ala	Ile	Gly
Thr	Val 130	Leu	Val	Gly	Pro	Thr 135	Pro	Ile	Asn	Ile	Ile 140	Gly	Arg	Asn	Met
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Ile	Leu	Glu	Pro	Phe 325	Arg	Thr	Lys	Asn	Pro 330	Glu	Ile	Val	Ile	Tyr 335	Gln

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- Arg Ala Lys Ile Glu Glu Leu Arg Glu His Leu Leu Arg Trp Gly Phe 355 360 365
- Thr Thr Pro Asp Lys Lys His Gln Lys Glu Pro Pro Phe Leu Trp Met 370 375 380
- Gly Tyr Glu Leu His Pro Asp Lys Trp Thr Val Gln Pro Ile Gln Leu 385 390 395 400
- Pro Asp Lys Glu Ser Trp Thr Val Asn Asp Ile Gln Lys Leu Val Gly
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- Lys Leu Asn Trp Ala Ser Gln Ile Tyr Pro Gly Ile Lys Val Lys Gln 420 425 430
- Leu Cys Lys Leu Leu Arg Gly Ala Lys Ala Leu Thr Asp Ile Val Pro
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- Leu Thr Ala Glu Ala Glu Leu Glu Leu Ala Glu Asn Arg Glu Ile Leu 450 455 460
- Lys Glu Pro Val His Gly Val Tyr Tyr Asp Pro Ser Lys Glu Leu Ile 465 470 475 480
- Ala Glu Val Gln Lys Gln Gly Leu Asp Gln Trp Thr Tyr Gln Ile Tyr
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- Gln Glu Pro Tyr Lys Asn Leu Lys Thr Gly Lys Tyr Ala Lys Arg Gly
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- Leu Pro Ile Arg Lys Glu Thr Trp Glu Val Trp Trp Thr Glu Tyr Trp 545 550 555 560
- Gln Ala Thr Trp Ile Pro Glu Trp Glu Phe Val Asn Thr Pro Pro Leu 565 570 575
- Val Lys Leu Trp Tyr Arg Leu Glu Thr Glu Pro Ile Pro Gly Ala Glu
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- Thr Tyr Tyr Val Asp Gly Ala Ala Asn Arg Glu Thr Lys Leu Gly Lys
 595 600 605
- Ala Gly Tyr Val Thr Asp Lys Gly Lys Gln Lys Ile Ile Thr Leu Thr 610 620
- Glu Thr Thr Asn Gln Lys Ala Glu Leu Gln Ala Ile His Leu Ala Leu 625 630 635 640

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Gly Ala Val Val Ile Gln Asp Asn Asn Glu Ile Lys Val Val Pro Arg 965

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Val Thr Val Lys Ile Glu Gly Gln Leu Arg Glu Ala Leu Leu Asp Thr 70 75

Gly Ala Asp Asp Thr Val Leu Glu Glu Ile Asn Leu Pro Gly Lys Trp 85

Lys Pro Lys Met Ile Gly Gly Ile Gly Phe Ile Lys Val Arg Gln 105

Tyr Glu Gln Val Ala Ile Glu Ile Cys Gly Lys Lys Ala Ile Gly Thr

Val Leu Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn Ile Leu 130

Thr Gln Ile Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile Glu Thr 150 155

Val Pro Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val Lys Gln 165 170 175

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Tyr	Asn 210	Thr	Pro	Ile	Phe	Ala 215	Ile	Lys	Lys	Lys	Asp 220	Ser	Thr	Lys	Trp
Arg 225	Lys	Leu	Val	Asp	Phe 230	Arg	Glu	Leu	Asn	Lys 235	Arg	Thr	Gln	Asp	Phe 240
Trp	Glu	Val	Gln	Leu 245	Gly	Ile	Pro	His	Pro 250	Ala	Gly	Leu	Lys	Lys 255	Lys
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Gly 305	Trp	Lys	Gly	Ser	Pro 310	Ala	Ile	Phe	Gln	Ser 315	Ser	Met	Thr	Lys	Ile 320
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Cys	Lys	Leu 435	Leu	Arg	Gly	Ala	Lys 440	Ala	Leu	Thr	Asp	Ile 445	Val	Pro	Leu
Thr	Lys 450	Glu	Ala	Glu	Leu	Glu 455	Leu	Ala	Glu	Asn	Arg 460	Glu	Ile	Leu	Arg
Glu 465	Pro	Val	His	Gly	Val 470	Tyr	Tyr	Asp	Pro	Ser 475	Lys	Asp	Leu	Ile	Ala 480

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- Ala His Thr Asn Asp Val Lys Gln Leu Thr Glu Ala Val Gln Lys Ile 515 520 525
- Ala Thr Glu Ser Ile Val Ile Trp Gly Lys Ile Pro Lys Phe Arg Leu 530 540
- Pro Ile Gln Lys Glu Thr Trp Glu Thr Trp Trp Thr Glu His Trp Gln 545 550 555 560
- Ala Thr Trp Ile Pro Glu Trp Glu Phe Val Asn Thr Pro His Leu Val
 565 570 575
- Lys Leu Trp Tyr Gln Leu Glu Thr Glu Pro Ile Ala Gly Ala Glu Thr 580 585 590
- Tyr Tyr Val Asp Gly Ala Ala Asn Arg Glu Thr Lys Ile Gly Lys Ala
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- Gly Tyr Val Thr Asp Arg Gly Lys Gln Lys Val Val Ser Leu Thr Glu 610 620
- Thr Thr Asn Gln Lys Thr Glu Leu Gln Ala Ile Tyr Leu Ala Leu Gln 625 630 635 640
- Asp Ser Gly Leu Glu Val Asn Ile Val Thr Asp Ser Gln Tyr Ala Leu 645 650 655
- Gly Ile Ile Gln Ala Gln Pro Asp Lys Ser Glu Ser Glu Leu Val Asn
 660 670
- Gln Ile Ile Glu Glu Leu Ile Lys Lys Glu Lys Val Tyr Leu Ser Trp
 675 680 685
- Val Pro Ala His Lys Gly Ile Gly Gly Asn Glu Gln Val Asp Lys Leu 690 695 700
- Val Ser Ser Gly Ile Arg Lys Val Leu Phe Leu Asp Gly Ile Asp Lys 705 710 715 720
- Ala Gln Glu Glu His Glu Arg Tyr His Asn Asn Trp Arg Ala Met Ala 725 730 735
- Ser Asp Phe Asn Leu Pro Pro Ile Val Ala Lys Glu Ile Val Ala Ser 740 745 750
- Cys Asp Lys Cys Gln Leu Lys Gly Glu Ala Met His Gly Gln Val Asp
 755 760 765
- Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu Gly Lys
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Val Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu Ala Glu 795 785 790 Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Ile Leu Lys 810 805 Leu Ala Gly Arg Trp Pro Val Lys Met Ile His Thr Asp Asn Gly Ser 825 Asn Phe Thr Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala Asp Ile 840 Gln Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly Val Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val Arg Asp Gln Ala Glu His Leu Arg Thr Ala Val Gln Met Ala Val Phe Ile His 890 Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly Glu Arg 905 Ile Ile Asp Ile Ile Ala Thr Asp Ile Gln Thr Lys Glu Leu Gln Lys 920 925 915 Gln Ile Ser Lys Ile Gln Lys Phe Arg Val Tyr Tyr Arg Asp Ser Arg 935 Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly Glu Gly 955 960 945 950 Ala Val Val Ile Gln Asp Asn Ser Glu Ile Lys Val Val Pro Arg Arg 970 Lys Ala Lys Ile Ile Arg Asp Tyr Gly Lys Gln Met Ala Gly Asp Asp 985 Cys Val Ala Gly Arg Gln Asp Glu Asp 995 <210> 241 <211> 1003 <212> PRT <213> Human immunodeficiency virus <400> 241

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Gly Thr Ser Ser Ser Phe Ser Phe Pro Gln Ile Thr Leu Trp Gln Arg Pro Leu Val Thr Val Lys Ile Gly Gly Gln Leu Lys Glu Ala Leu Leu Asp Thr Gly Ala Asp Asp Thr Val Leu Glu Asp Ile Asn Leu Pro Gly Lys Trp Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val 105 Arg Gln Tyr Asp Gln Ile Leu Ile Glu Ile Cys Gly Lys Lys Ala Ile 115 120 Gly Thr Val Leu Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn 135 Met Leu Thr Gln Ile Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile 155 150 Asp Thr Val Pro Val Thr Leu Lys Pro Gly Met Asp Gly Pro Lys Val 165 Lys Gln Trp Pro Leu Thr Glu Glu Lys Ile Lys Ala Leu Thr Glu Ile Cys Lys Glu Met Glu Glu Glu Gly Lys Ile Ser Lys Ile Gly Pro Glu Asn Pro Tyr Asn Thr Pro Val Phe Ala Ile Lys Lys Lys Asp Ser Thr Lys Trp Arg Lys Leu Val Asp Phe Arg Glu Leu Asn Lys Arg Thr Gln 235 Asp Phe Trp Glu Val Gln Leu Gly Ile Pro His Pro Ala Gly Leu Lys 245 250 Lys Lys Lys Ser Val Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser 265 Val Pro Leu Asp Glu Ser Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro 275 285 Ser Ile Asn Asn Glu Thr Pro Gly Ile Arg Tyr Gln Tyr Asn Val Leu

Pro Gln Gly Trp Lys Gly Ser Pro Ala Ile Phe Gln Ser Ser Met Thr 305

Lys Ile Leu Glu Pro Phe Arg Ile Lys Asn Pro Glu Met Val Ile Tyr 325

Gln Tyr Met Asp Asp Leu Tyr Val Gly Ser Asp Leu Glu Ile Gly Gln 340

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- Val Asn Gln Ile Ile Glu Glu Leu Ile Lys Lys Glu Lys Val Tyr Leu 675 680 685
- Ser Trp Val Pro Ala His Lys Gly Ile Gly Gly Asn Glu Gln Val Asp 690 695 700
- Lys Leu Val Ser Ser Gly Ile Arg Lys Val Leu Phe Leu Asp Gly Ile 705 710 715 720
- Asp Lys Ala Glu Glu His Glu Arg Tyr His Ser Asn Trp Arg Thr
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- Val Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu
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- Leu Lys Leu Ala Gly Arg Trp Pro Val Lys Val Ile His Thr Asp Asn 820 825 830
- Gly Ser Asn Phe Thr Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala 835 840 845
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- Ser Arg Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly 945 950 955 960

Glu Gly Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro 965 970 975

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                                 25
Asp Gly Gly Arg Asp Asn Leu Leu Ser Glu Ala Gly Thr Glu Gly Gln
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Gly Thr Ile Ser Ser Phe Asn Phe Pro Gln Ile Thr Leu Trp Gln Arg
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Pro Leu Val Thr Val Arg Ile Gly Gly Gln Leu Ile Glu Ala Leu Leu
Asp Thr Gly Ala Asp Asp Thr Val Leu Glu Glu Ile Asn Leu Pro Gly
                                     90
Lys Trp Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val
                                                     110
            100
                                105
Arg Gln Tyr Asp Gln Ile Leu Ile Glu Ile Cys Gly Lys Lys Ala Ile
                            120
Gly Thr Val Leu Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn
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                        135
                                            140
Met Leu Thr Gln Ile Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile
145
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                                        155
Glu Thr Val Pro Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val
                165
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Lys Gln Trp Pro Leu Thr Glu Glu Lys Ile Lys Ala Leu Thr Asp Ile

185

190

180

Cys	Thr	Glu 195	Met	Glu	Lys	Glu	Gly 200	Lys	Ile	Ser	Lys	Ile 205	Gly	Pro	Glu
Asn	Pro 210	Tyr	Asn	Thr	Pro	Val 215	Phe	Ala	Ile	Lys	Lys 220	Lys	Asp	Ser	Thr
Lys 225	Trp	Arg	Lys	Leu	Val 230	Asp	Phe	Arg	Glu	Leu 235	Asn	Lys	Arg	Thr	Gln 240
Asp	Phe	Trp	Glu	Val 245	Gln	Leu	Gly	Ile	Pro 250	His	Pro	Ala	Gly	Leu 255	Lys
Lys	Lys	Lys	Ser 260	Val	Thr	Val	Leu	Asp 265	Val	Gly	Asp	Ala	Tyr 270	Phe	Ser
Val	Pro	Leu 275	Asp	Lys	Asp	.Phe	Arg 280	Lys	Tyr	Thr	Ala	Phe 285	Thr	Ile	Pro
Ser	Val 290	Asn	Asn	Glu	Thr	Pro 295	Gly	Ile	Arg	Tyr	Gln 300	Tyr	Asn	Val	Leu
Pro 305	Gln	Gly	Trp	Lys	Gly 310	Ser	Pro	Ala	Ile	Phe 315	Gln	Ala	Ser	Met	Thr 320
Lys	Ile	Leu	Glu	Pro 325	Phe	Arg	Thr	Lys	Asn 330	Pro	Glu	Ile	Val	Ile 335	Tyr
Gln	Tyr	Met	Asp 340	Asp	Leu	Tyr	Val	Gly 345	Ser	Asp	Leu	Glu	Ile 350	Gly	Gln
His	Arg	Ala 355	Lys	Ile	Glu	Glu	Leu 360	Arg	Glu	His	Leu	Leu 365	Arg	Trp	Gly
Phe	Thr 370	Thr	Pro	Asp	Lys	Lys 375	His	Gln	Lys	Glu	Pro 380	Pro	Phe	Leu	Trp
Met 385	Gly	Tyr	Glu	Leu	His 390	Pro	Asp	Lys	Trp	Thr 395	Val	Gln	Pro	Ile	Gln 400
Leu	Pro	Glu	Lys	Asp 405	Ser	Trp	Thr	Val	Asn 410	Asp	Ile	Gln	Lys	Leu 415	Val
Gly	Lys	Leu	Asn 420	Trp	Ala	Ser	Gln	Ile 425	Tyr	Ala	Gly	Ile	Lys 430	Val	Lys
Gln	Leu	Cys 435	Lys	Leu	Leu	Arg	Gly 440	Ala	Lys	Ala	Leu	Thr 445	Asp	Ile	Val
Thr	Leu 450	Thr	Glu	Glu	Ala	Glu 455	Leu	Glu	Leu	Ala	Glu 460	Asn	Arg	Glu	Ile
Leu 465	Lys	Glu	Pro	Val	His 470	Gly	Val	Tyr	Tyr	Asp 475	Pro	Thr	Lys	Asp	Leu 480
Ile	Ala	Glu	Ile	Gln 485	Lys	Gln	Gly	Gln	Asp 490	Gln	Trp	Thr	Tyr	Gln 495	Ile

- Tyr Gln Glu Pro Phe Lys Asn Leu Lys Thr Gly Lys Tyr Ala Lys Met 500 505 510
- Arg Ser Ala His Thr Asn Asp Val Lys Gln Leu Thr Glu Val Val Gln 515 520 525
- Lys Val Ala Thr Glu Ser Ile Val Ile Trp Gly Lys Thr Pro Lys Phe 530 540
- Arg Leu Pro Ile Gln Arg Glu Thr Trp Glu Ala Trp Trp Met Glu Tyr 545 550 555 560
- Trp Gln Ala Thr Trp Ile Pro Glu Trp Glu Phe Val Asn Thr Pro Pro 565 570 575
- Leu Val Lys Leu Trp Tyr Gln Leu Glu Lys Asp Pro Ile Val Gly Ala
 580 585 590
- Glu Thr Phe Tyr Val Asp Gly Ala Ala Asn Arg Glu Thr Lys Leu Gly 595 600 605
- Lys Ala Gly Tyr Val Thr Asp Arg Gly Arg Gln Lys Val Val Ser Leu 610 620
- Thr Glu Thr Thr Asn Gln Lys Thr Glu Leu His Ala Ile His Leu Ala 625 630 635
- Leu Gln Asp Ser Gly Ser Glu Val Asn Ile Val Thr Asp Ser Gln Tyr
 645 650 655
- Ala Leu Gly Ile Ile Gln Ala Gln Pro Asp Arg Ser Glu Ser Glu Leu
 660 665 670
- Val Asn Gln Ile Ile Glu Lys Leu Ile Glu Lys Asp Lys Val Tyr Leu
 675 680 685
- Ser Trp Val Pro Ala His Lys Gly Ile Gly Gly Asn Glu Gln Val Asp
 690 695 700
- Lys Leu Val Ser Asn Gly Ile Arg Lys Val Leu Phe Leu Asp Gly Ile
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- Asp Lys Ala Gln Glu Glu His Glu Arg Tyr His Ser Asn Trp Arg Ala
 725 730 735
- Met Ala Ser Asp Phe Asn Leu Pro Pro Ile Val Ala Lys Glu Ile Val 740 745 750
- Ala Ser Cys Asp Lys Cys Gln Leu Lys Gly Glu Ala Met His Gly Gln 755 760 765
- Val Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu
 770 780
- Gly Lys Ile Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu
 785 790 795 800

Ala Glu Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Ile 805 810 815

Leu Lys Leu Ala Gly Arg Trp Pro Val Lys Val Ile His Thr Asp Asn 820 825 830

Gly Ser Asn Phe Thr Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala 835 840 845

Asn Val Thr Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly 850 855 860

Val Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val 865 870 875 880

Arg Asp Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe 885 890 895

Ile His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly
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Glu Arg Ile Ile Asp Ile Ile Ala Ser Asp Ile Gln Thr Lys Glu Leu 915 920 925

Gln Lys Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp 930 935 940

Ser Arg Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly 945 955 960

Glu Gly Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro 965 970 975

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Asp Asp Cys Val Ala Gly Arg Gln Asp Glu Asp 995 1000

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<211> 1003

<212> PRT

<213> Human immunodeficiency virus

<400> 245

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Gly Thr Ala Ser Ser Phe Asn Phe Pro Gln Ile Thr Leu Trp Gln Arg
50 55 60

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Lys	Trp	Lys	Pro 100	Lys	Met	Ile	Gly	Gly 105	Ile	Gly	Gly	Phe	Ile 110	Lys	Val
Arg	Gln	Tyr 115	Asp	Gln	Ile	Leu	Ile 120	Glu	Ile	Cys	Gly	Lys 125	Lys	Ala	Ile
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Glu	Thr	Val	Pro	Val 165	Thr	Leu	Lys	Pro	Gly 170	Met	Asp	Gly	Pro	Lys 175	Val
Lys	Gln	Trp	Pro 180	Leu	Thr	Glu	Glu	Lys 185	Ile	Lys	Ala	Leu	Thr 190	Asp	Ile
Cys	Lys	Glu 195	Met	Glu	Lys	Glu	Gly 200	Lys	Ile	Ser	Lys	Ile 205	Gly	Pro	Glu
Asn	Pro 210	Tyr	Asn	Thr	Pro	Val 215	Phe	Ala	Ile	Lys	Lys 220	Lys	Asp	Ser	Thr
Lys 225	Trp	Arg	Lys	Leu	Val 230	Asp	Phe	Arg	Glu	Leu 235	Asn	Lys	Arg	Thr	Gln 240
Asp	Phe	Trp	Glu	Val 245	Gln	Leu	Gly	Ile	Pro 250	His	Pro	Ala	Gly	Leu 255	Lys
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Lys	Ile	Leu	Glu	Pro 325	Phe	Arg	Lys	Gln	Asn 330	Pro	Glu	Ile	Val	Ile 335	Tyr
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Pro	Leu 450	Thr	Ala	Glu	Ala	Glu 455	Leu	Glu	Leu	Ala	Glu 460	Asn	Arg	Glu	Ile
Leu 465	Lys	Glu	Pro	Val	His 470	Gly	Val	Tyr	Tyr	Asp 475	Pro	Ser	Lys	Asp	Leu 480
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- Val Ser Gln Ile Ile Glu Gln Leu Ile Lys Lys Glu Lys Val Tyr Leu 675 680 685
- Ala Trp Val Pro Ala His Lys Gly Ile Gly Gly Asn Glu Gln Val Asp
 690 695 700
- Lys Leu Val Ser Ala Gly Ile Arg Lys Val Leu Phe Leu Asp Gly Ile 705 710 715 720
- Asp Lys Ala Gln Glu Ala His Glu Lys Tyr His Ser Asn Trp Arg Ala 725 730 735
- Met Ala Ser Asp Phe Asn Leu Pro Pro Val Val Ala Lys Glu Ile Val
 740 745 750
- Ala Ser Cys Asp Lys Cys Gln Leu Lys Gly Glu Ala Met His Gly Gln
 755 760 765
- Val Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu
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- Gly Lys Ile Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu
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- Ala Glu Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Val 805 810 815
- Leu Lys Leu Ala Gly Arg Trp Pro Val Lys Ile Ile His Thr Asp Asn 820 825 830
- Gly Ser Asn Phe Ile Ser Thr Ala Val Lys Ala Ala Cys Trp Trp Ala 835 840 845
- Gly Ile Lys Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly 850 860
- Val Val Glu Ser Met Asn Lys Gln Leu Lys Gln Ile Ile Gly Gln Val 865 870 875 880
- Arg Asp Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe 885 890 895
- Ile His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly 900 905 910
- Glu Arg Ile Ile Asp Ile Ile Ala Thr Asp Ile Gln Thr Lys Glu Leu 915 920 925
- Gln Lys Gln Ile Ile Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp 930 935 940
- Ser Arg Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Trp Lys Gly 945 950 955 960
- Glu Gly Ala Val Val Ile Gln Asp Asn Asp Ile Lys Val Val Pro 965 970 975

Arg Arg Lys Ala Lys Ile Ile Arg Asp Tyr Gly Lys Gln Met Ala Gly 980 985 990

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Gly Thr Ile Ser Phe Asn Phe Pro Gln Ile Thr Leu Trp Gln Arg Pro
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Leu Val Thr Ile Lys Ile Gly Gly Gln Ile Arg Glu Ala Leu Leu Asp
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Trp Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val Arg
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Gln Tyr Asp Gln Ile Pro Ile Glu Ile Cys Gly Lys Lys Ala Ile Gly
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Thr Val Leu Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn Met
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                                                             160
145
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Thr Val Pro Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val Lys
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Gln Trp Pro Leu Thr Glu Glu Lys Ile Lys Ala Leu Thr Glu Ile Cys
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Thr Glu Met Glu Lys Glu Gly Lys Ile Ser Lys Ile Gly Pro Glu Asn

205

200

195

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Phe Trp G	lu Val Gl 24	_	/ Ile	Pro	His 250	Pro	Ala	Gly	Leu	Lys 255	Lys
Lys Lys S	er Val Th 260	r Val Leu	a Asp	Val 265	Gly	Asp	Ala	Tyr	Phe 270	Ser	Val
Pro Leu A 2	sp Pro Gl 75	u Phe Arg	280	Tyr	Thr	Ala	Phe	Thr 285	Ile	Pro	Ser
Thr Asn A 290	sn Glu Th	r Pro Gly 299		Arg	Tyr	Gln	Tyr 300	Asn	Val	Leu	Pro
Gln Gly T 305	rp Lys Gl	y Ser Pro 310	Ala	Ile	Phe	Gln 315	Cys	Ser	Met	Thr	Lys 320
Ile Leu G	lu Pro Ph 32	_	. Lys	Asn	Pro 330	Glu	Ile	Val	Ile	Tyr 335	Gln
Tyr Met A	sp Asp Le 340	u Tyr Val	Gly	Ser 345	Asp	Leu	Glu	Ile	Gly 350	Gln	His
Arg Ala L 3	ys Ile Gl 55	u Glu Leı	Arg 360	Glu	His	Leu	Leu	Arg 365	Trp	Gly	Phe
Ser Thr P	ro Asp Ly	s Lys His 379		Lys	Glu	Pro	Pro 380	Phe	Leu	Trp	Met
Gly Tyr G 385	lu Leu Hi	s Pro Asp 390	Lys	Trp	Thr	Val 395	Gln	Pro	Ile	Gln	Leu 400
Ala Glu L	ys Asp Se 40	_	. Val	Asn	Asp 410	Ile	Gln	Lys	Leu	Val 415	Gly
Lys Leu A	sn Trp Al 420	a Ser Glı	ı Ile	Tyr 425	Pro	Gly	Ile	Lys	Val 430	Lys	Gln
Leu Cys L 4	ys Leu Le 35	u Arg Gly	/ Ala 440	Lys	Ala	Leu	Thr	Asp 445	Ile	Val	Pro
Leu Thr T 450	hr Glu Al	a Glu Let 459		Leu	Ala	Glu	Asn 460	Arg	Glu	Ile	Leu
Lys Glu P 465	ro Val Hi	s Gly Ala 470	Tyr	Tyr	Asp	Pro 475	Ser	Lys	Asp	Leu	Ile 480
Ala Glu I	le Gln Ly 48		/ Gln	Gly	Gln 490	Trp	Thr	Tyr	Gln	Ile 495	Tyr
Gln Glu P	ro Tyr Ly 500	s Asn Lei	Lys	Thr 505	Gly	Lys	Tyr	Ala	Lys 510	Thr	Arg

Ser Ala His Thr Asn Asp Val Arg Gln Leu Thr Glu Ala Val Gln Lys 520 Ile Ala Met Glu Cys Ile Val Ile Trp Gly Lys Thr Pro Lys Phe Arg 535 Leu Pro Ile Gln Lys Glu Thr Trp Asp Thr Trp Trp Thr Glu Tyr Trp 555 Gln Ala Thr Trp Ile Pro Glu Trp Glu Phe Val Asn Thr Pro Pro Leu 565 570 Val Lys Leu Trp Tyr Gln Leu Glu Thr Asp Pro Ile Ala Gly Ala Glu 585 Thr Phe Tyr Val Asp Gly Ala Ala Ser Arg Glu Thr Lys Gln Gly Lys 595 Ala Gly Tyr Val Thr Asp Arg Gly Arg Gln Lys Val Val Ser Leu Ser Glu Thr Thr Asn Gln Lys Thr Glu Leu Gln Ala Ile Tyr Leu Ala Leu 635 Gln Asp Ser Gly Ser Glu Val Asn Ile Val Thr Asp Ser Gln Tyr Ala 645 650 Ile Gly Ile Ile Gln Ala Gln Pro Asp Arg Ser Glu Ser Asp Leu Val 665 Asn Gln Ile Ile Glu Gln Leu Ile Gln Lys Asp Lys Val Tyr Leu Ser 675 Trp Val Pro Ala His Lys Gly Ile Gly Gly Asn Glu Gln Val Asp Lys 695 Leu Val Ser Asn Gly Ile Arg Lys Val Leu Phe Leu Asp Gly Ile Asp 715 Lys Ala Gln Glu His Glu Lys Tyr His Asn Asn Trp Arg Ala Met Ala Ser Asp Phe Asn Leu Pro Pro Val Val Ala Lys Glu Ile Val Ala 745 Ser Cys Asn Lys Cys Gln Leu Lys Gly Glu Ala Met His Gly Gln Val 760 Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu Gly 775 Lys Ile Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu Ala 795

Glu Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Ile Leu

- Lys Leu Ala Gly Arg Trp Pro Val Lys Ile Ile His Thr Asp Asn Gly 820 825 830
- Pro Asn Phe Thr Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala Asp 835 840 845
- Ile Gln Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly Val 850 855 860
- Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val Arg 865 870 875 880
- Asp Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe Ile 885 890 895
- His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly Glu
- Arg Ile Ile Asp Ile Ile Ala Ser Asp Ile Gln Thr Lys Glu Leu Gln 915 920 925
- Lys Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp Ser 930 935 940
- Arg Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly Glu 945 950 955 960
- Gly Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro Arg 965 970 975
- Arg Lys Ala Lys Ile Ile Arg Asp Tyr Gly Lys Gln Met Ala Gly Asp 980 985 990
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<211> 1002

<212> PRT

<213> Human immunodeficiency virus

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 35 40 45
- Gly Ala Ile Ser Leu Ser Phe Pro Gln Ile Thr Leu Trp Gln Arg Pro
 50 55 60
- Leu Val Thr Val Arg Ile Gly Gly Gln Leu Ile Glu Ala Leu Leu Asp
 65 70 75 80

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Thr	Val 130	Leu	Val	Gly	Pro	Thr 135	Pro	Val	Asn	Ile	Ile 140	Gly	Arg	Asn	Met
Leu 145	Thr	Gln	Ile	Gly	Cys 150	Thr	Leu	Asn	Phe	Pro 155	Ile	Ser	Pro	Ile	Glu 160
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Pro	Tyr 210	Asn	Thr	Pro	Ile	Phe 215	Ala	Ile	Lys	Lys	Lys 220	Asp	Ser	Thr	Lys
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Asn	Gln	Ile 675	Ile	Glu	Gln	Leu	Ile 680	Lys	Lys	Glu	Lys	Val 685	Tyr	Leu	Ser

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<210> 252

<211> 999

<212> PRT

<213> Human immunodeficiency virus

<400> 252

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Thr Leu Asn Phe Pro Gln Ile Thr Leu Trp Gln Arg Pro Leu Val Ser 50 55 60

Ile Lys Val Gly Gln Ile Lys Glu Ala Leu Leu Asp Thr Gly Ala 65 70 75 80

Asp Asp Thr Val Leu Glu Glu Val Asn Leu Pro Gly Lys Trp Lys Pro 85 90 95

Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val Arg Gln Tyr Glu

Gln Ile Pro Ile Glu Ile Cys Gly Lys Lys Ala Ile Gly Thr Val Leu 115 120 125

Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn Met Leu Thr Gln 130 135 140

Leu Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile Glu Thr Val Pro 145 150 155 160

Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val Lys Gln Trp Pro 165 170 175

Leu Thr Glu Glu Lys Ile Lys Ala Leu Thr Ala Ile Cys Asp Glu Met 180 185 190

Glu Lys Glu Gly Lys Ile Thr Lys Ile Gly Pro Asp Asn Pro Tyr Asn 195 200 205

Thr Pro Ile Phe Ala Ile Arg Lys Lys Asp Ser Ser Lys Trp Arg Lys 210 215 220

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Val	Thr	Val	Leu 260	Asp	Val	Gly	Asp	Ala 265	Tyr	Phe	Ser	Val	Pro 270	Leu	Asp
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Pro Gly Ile 770	Trp Gln	Leu As		Thr	His	Leu	Glu 780	Gly	Lys	Ile	Ile
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Pro Ala Glu	Thr Gly 805	Gln Gl	u Thr	Ala	Tyr 810	Phe	Ile	Leu	Lys	Leu 815	Ala
Gly Arg Trp	Pro Val 820	Lys Va	l Ile	His 825	Thr	Asp	Asn	Gly	Ser 830	Asn	Phe

Thr Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala Gly Ile Gln Gln 835 840 845

Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly Val Val Glu Ser 850 855 860

Met Asn Lys Glu Leu Lys Lys Leu Ile Gly Gln Val Arg Asp Gln Ala 865 870 875 880

Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe Ile His Asn Phe 885 890 895

Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly Glu Arg Ile Val 900 905 910

Asp Ile Ile Ala Thr Asp Ile Gln Thr Arg Glu Leu Gln Lys Gln Ile 915 920 925

Ile Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp Ser Arg Asp Pro 930 935 940

Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly Glu Gly Ala Val 945 950 955 960

Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro Arg Arg Lys Ala 965 970 975

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<210> 253

<211> 1003

<212> PRT

<213> Human immunodeficiency virus

<400> 253

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Gly Ala Val Ser Leu Ser Phe Pro Gln Ile Thr Leu Trp Gln Arg Pro 50 60

Leu Val Thr Val Lys Ile Gly Gly Gln Leu Lys Glu Ala Leu Leu Asp 65 70 75 80

Thr Gly Ala Asp Asp Thr Val Leu Glu Glu Met Asn Leu Pro Gly Lys
85 90 95

Trp Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val Arg Gln Tyr Asp Gln Ile Leu Ile Glu Ile Cys Gly Tyr Lys Ala Ile Gly 115 Thr Val Leu Val Gly Pro Thr Pro Val Asn Ile Ile Gly Arg Asn Leu 135 Leu Thr Gln Ile Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile Glu 155 Thr Val Pro Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val Lys Gln Trp Pro Leu Thr Glu Glu Lys Ile Lys Ala Leu Thr Glu Ile Cys 185 Thr Glu Met Glu Lys Glu Gly Lys Ile Ser Arg Ile Gly Pro Glu Asn Pro Tyr Asn Thr Pro Ile Phe Ala Ile Lys Lys Asp Ser Thr Lys 215 Trp Arg Lys Leu Val Asp Phe Arg Glu Leu Asn Lys Arg Thr Gln Asp Phe Trp Glu Val Gln Leu Gly Ile Pro His Pro Ala Gly Leu Lys Lys Lys Lys Ser Val Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser Val Pro Leu Tyr Glu Asp Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro Ser Ile Asn Asn Glu Thr Pro Gly Ile Arg Tyr Gln Tyr Asn Val Leu Pro 290 295 Gln Gly Trp Lys Gly Ser Pro Ala Ile Phe Gln Ser Ser Met Thr Lys 315 Ile Leu Glu Pro Phe Arg Lys Gln Asn Pro Glu Met Val Ile Tyr Gln 325 Tyr Met Asp Asp Leu Tyr Val Gly Ser Asp Leu Glu Ile Gly Gln His Arg Ile Lys Ile Glu Glu Leu Arg Gly His Leu Leu Lys Trp Gly Phe

Thr Thr Pro Asp Lys Lys His Gln Lys Glu Pro Pro Phe Leu Trp Met

Gly Tyr Glu Leu His Pro Asp Lys Trp Thr Val Gln Pro Ile Gln Leu

395

375

390

370

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Leu	Thr 450	Glu	Glu	Ala	Glu	Leu 455	Glu	Leu	Ala	Glu	Asn 460	Arg	Glu	Ile	Leu
Lys 465	Glu	Pro	Val	His	Gly 470	Val	Tyr	Tyr	Asp	Pro 475	Ser	Lys	Asp	Leu	Ile 480
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Gln	Glu	Pro	His 500	Lys	Asn	Leu	Lys	Thr 505	Gly	Lys	Tyr	Ala	Lys 510	Arg	Arg
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Gln	Asp	Ser	Gly	Ser 645	Glu	Val	Asn	Ile	Val 650	Thr	Asp	Ser	Gln	Tyr 655	Ala
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Asn	Gln	Ile 675	Ile	Glu	Gln	Leu	Ile 680	Lys	Lys	Glu	Lys	Val 685	Tyr	Leu	Ser
Trp	Val 690	Pro	Ala	His	Lys	Gly 695	Ile	Gly	Gly	Asn	Glu 700	Gln	Val	Asp	Lys

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Ala	Ser	Asp	Phe 740	Asn	Leu	Pro	Pro	Val 745	Val	Ala	Lys	Glu	Ile 750	Val	Ala
Ser	Cys	Asp 755	Lys	Cys	Gln	Leu	Lys 760	Gly	Glu	Ala	Leu	His 765	Gly	Gln	Val
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Ser	Asn	Phe 835	Thr	Ser	Ala	Ala	Val 840	Lys	Ala	Ala	Cys	Trp 845	Trp	Ala	Gly
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Val 865	Glu	Ser	Met	Asn	Lys 870	Glu	Leu	Lys	Lys	Ile 875	Ile	Gly	Gln	Val	Arg 880
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His	Asn	Phe	Lys 900	Arg	Lys	Gly	Gly	Ile 905	Gly	Gly	Tyr	Ser	Ala 910	Gly	Glu
Arg	Ile	Ile 915	Asp	Ile	Ile	Ala	Thr 920	Asp	Ile	Gln	Thr	Lys 925	Glu	Leu	Gln
Lys	Gln 930	Ile	Ile	Lys	Ile	Gln 935	Asn	Phe	Arg	Val	Tyr 940	Tyr	Arg	Asp	Ser
Arg 945	Asp	Pro	Ile	Trp	Lys 950	Gly	Pro	Ala	Lys	Leu 955	Leu	Trp	Lys	Gly	Glu 960
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<210> 254
<211> 3000
<212> DNA
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Phe Trp Glu Val Gln Leu Gly Ile Pro His Pro Ala Gly Leu Lys Lys

Lys Lys Ser Val Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser Val Pro Leu Asp Glu Ser Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro Ser Ile Asn Asn Glu Thr Pro Gly Ile Arg Tyr Gln Tyr Asn Val Leu Pro Gln Gly Trp Lys Gly Ser Pro Ala Ile Phe Gln Ser Ser Met Thr Lys 315 Ile Leu Glu Pro Phe Arg Thr Gln Asn Pro Glu Ile Val Ile Tyr Gln 330 Tyr Met Asp Asp Leu Tyr Val Gly Ser Asp Leu Glu Ile Gly Gln His 345 340 Arg Glu Lys Val Glu Glu Leu Arg Lys His Leu Leu Lys Trp Gly Phe Thr Thr Pro Asp Lys Lys His Gln Lys Glu Pro Pro Phe Leu Trp Met 375 Gly Tyr Glu Leu His Pro Asp Lys Trp Thr Val Gln Pro Ile Gln Leu Pro Asp Lys Glu Cys Trp Thr Val Asn Asp Ile Gln Lys Leu Val Gly Lys Leu Asn Trp Ala Ser Gln Ile Tyr Pro Gly Ile Lys Val Lys Gln Leu Cys Lys Leu Leu Arg Gly Thr Lys Ala Leu Thr Asp Ile Val Pro Leu Thr Ala Glu Ala Glu Leu Glu Leu Ala Glu Asn Arg Glu Ile Leu Lys Glu Pro Val His Gly Val Tyr Tyr Asp Pro Ser Lys Asp Leu Ile 465 470 Ala Glu Val Gln Lys Gln Gly Leu Asp Gln Trp Thr Tyr Gln Ile Tyr Gln Glu Pro Phe Lys Asn Leu Lys Thr Gly Lys Tyr Ala Lys Arg Arg 505 Thr Ala His Thr Asn Asp Val Arg Gln Leu Ala Glu Val Val Gln Lys 515 Ile Ser Met Glu Ser Ile Val Ile Trp Gly Lys Ile Pro Lys Phe Arg

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- Val Lys Leu Trp Tyr Gln Leu Glu Lys Glu Pro Ile Ile Gly Ala Glu
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- Thr Phe Tyr Val Asp Gly Ala Ala Asn Arg Glu Thr Lys Leu Gly Lys 595 600 605
- Ala Gly Tyr Val Thr Asp Lys Gly Arg Gln Lys Val Val Thr Leu Thr 610 615 620
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- Gln Asp Ser Gly Leu Glu Val Asn Ile Val Thr Asp Ser Gln Tyr Ala 645 650 655
- Leu Gly Ile Ile Gln Ala Gln Pro Asp Lys Ser Glu Ser Glu Leu Val
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- Trp Val Pro Ala His Lys Gly Ile Gly Gly Asn Glu Gln Val Asp Lys
 690 695 700
- Leu Val Ser Ser Gly Ile Arg Lys Val Leu Phe Leu Asp Gly Ile Asp 705 710 715 720
- Lys Ala Gln Glu His Glu Arg Tyr His Ser Asn Trp Arg Ala Met
 725 730 735
- Ala Ser Asp Phe Asn Leu Pro Pro Ile Val Ala Lys Glu Ile Val Ala 740 745 750
- Ser Cys Asp Lys Cys Gln Leu Lys Gly Glu Ala Met His Gly Gln Val 755 760 765
- Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu Gly 770 780
- Lys Ile Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu Ala 785 790 795 800
- Glu Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Ile Leu 805 810 815
- Lys Leu Ala Gly Arg Trp Pro Val Lys Val Ile His Thr Asp Asn Gly 820 825 830
- Ser Asn Phe Thr Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala Asn 835 840 845
- Ile Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly Val

850 855 860

Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val Arg 865 870 875 880

Glu Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe Ile 885 890 895

His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly Glu 900 905 910

Arg Ile Val Asp Ile Ile Ala Thr Asp Leu Gln Thr Lys Glu Leu Gln 915 920 925

Lys Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp Ser 930 935 940

Arg Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly Glu 945 950 955 960

Gly Ala Val Val Ile Gln Asp Asn Ser Asp Ile Lys Val Val Pro Arg 965 970 975

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Gly Thr Val Pro Ser Leu Ser Phe Pro Gln Ile Thr Leu Trp Gln Arg
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Pro Leu Val Thr Ile Lys Val Gly Gln Leu Lys Glu Ala Leu Leu 65 70 75 80

Asp Thr Gly Ala Asp Asp Thr Val Leu Glu Asp Ile Asn Leu Pro Gly 85 90 95

Lys Trp Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val

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Glu	Thr	Val	Pro	Val 165	Lys	Leu	Lys	Pro	Gly 170	Met	Asp	Gly	Pro	Lys 175	Val
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- Glu Thr Phe Tyr Val Asp Gly Ala Ser Asn Arg Glu Thr Lys Lys Gly
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- Lys Ala Gly Tyr Val Thr Asp Arg Gly Arg Gln Lys Ala Val Ser Leu 610 615 620
- Thr Glu Thr Thr Asn Gln Lys Ala Glu Leu His Ala Ile Gln Leu Ala 625 630 635 640
- Leu Gln Asp Ser Gly Ser Glu Val Asn Ile Val Thr Asp Ser Gln Tyr
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- Ala Leu Gly Ile Ile Gln Ala Gln Pro Asp Lys Ser Glu Ser Glu Leu 660 665 670
- Val Asn Gln Ile Ile Glu Gln Leu Ile Lys Lys Glu Lys Val Tyr Leu 675 680 685
- Ser Trp Val Pro Ala His Lys Gly Ile Gly Gly Asn Glu Gln Val Asp 690 695 700
- Lys Leu Val Ser Ala Gly Ile Arg Lys Ile Leu Phe Leu Asp Gly Ile 705 710 715 720

Asp Lys Ala Glu Glu His Glu Lys Tyr His Asn Asn Trp Arg Ala
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Met Ala Ser Asp Phe Asn Leu Pro Pro Val Val Ala Lys Glu Ile Val 740 745 750

Ala Ser Cys Asp Lys Cys Gln Leu Lys Gly Glu Ala Met His Gly Gln 755 760 765

Val Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu
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Gly Lys Ile Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Leu Glu 785 790 795 800

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Leu Lys Leu Ala Gly Arg Trp Pro Val Lys Thr Ile His Thr Asp Asn 820 825 830

Gly Pro Asn Phe Ser Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala 835 840 845

Gly Ile Gln Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly 850 855 860

Val Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Arg Gln Val 865 870 875 880

Arg Asp Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe 885 890 895

Ile His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly 900 905 910

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Gln Lys Gln Ile Ile Lys Ile Gln Asn Phe Arg Val Tyr Tyr Arg Asp 930 935 940

Ser Arg Asp Pro Val Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly 945 950 955 960

Glu Gly Ala Val Val Ile Gln Asp Asn Ser Glu Ile Lys Val Val Pro 965 970 975

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<213> Human immunodeficiency virus

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Gly Asp Ile Pro Leu Ser Leu Pro Gln Ile Thr Leu Trp Gln Arg Pro 50 55 60

Leu Val Thr Val Arg Ile Gly Gly Gln Leu Ile Glu Ala Leu Leu Asp
65 70 75 80

Thr Gly Ala Asp Asp Thr Val Leu Glu Asp Ile Asn Leu Pro Gly Lys
85 90 95

Trp Lys Pro Lys Met Ile Gly Gly Ile Gly Gly Phe Ile Lys Val Arg

Gln Tyr Asp Gln Ile Leu Ile Glu Ile Cys Gly Lys Lys Ala Ile Gly 115 120 125

Thr Val Leu Val Gly Pro Thr Pro Ile Asn Ile Ile Gly Arg Asn Met 130 135 140

Leu Thr Gln Ile Gly Cys Thr Leu Asn Phe Pro Ile Ser Pro Ile Glu 145 150 155 160

Thr Val Pro Val Lys Leu Lys Pro Gly Met Asp Gly Pro Lys Val Lys 165 170 175

Gln Trp Pro Leu Thr Glu Glu Lys Ile Lys Ala Leu Thr Asp Ile Cys 180 185 190

Thr Glu Met Glu Arg Glu Gly Lys Ile Ser Lys Ile Gly Pro Glu Asn 195 200 205

Pro Tyr Asn Thr Pro Ile Phe Ala Ile Lys Lys Lys Asp Ser Thr Lys 210 215 220

Trp Arg Lys Leu Val Asp Phe Arg Glu Leu Asn Lys Arg Thr Gln Asp 225 230 235 240

Phe Trp Glu Val Gln Leu Gly Ile Pro His Pro Ser Gly Leu Lys Lys 245 250 255

Lys Lys Ser Val Thr Val Leu Asp Val Gly Asp Ala Tyr Phe Ser Val

Pro Leu Asp Glu Ser Phe Arg Lys Tyr Thr Ala Phe Thr Ile Pro Ser 275 Thr Asn Asn Glu Thr Pro Gly Ile Arg Tyr Gln Tyr Asn Val Leu Pro Gln Gly Trp Lys Gly Ser Pro Ala Ile Phe Gln Ser Ser Met Thr Lys 315 Ile Leu Glu Pro Phe Arg Ile Lys Asn Pro Glu Ile Val Ile Tyr Gln 330 Tyr Met Asp Asp Leu Tyr Val Gly Ser Asp Leu Glu Ile Gly Gln His 345 Arg Ala Lys Ile Glu Glu Leu Arg Lys His Leu Leu Ser Trp Gly Phe 360 355 Thr Thr Pro Asp Lys Lys His Gln Lys Glu Pro Pro Phe Leu Trp Met 375 Gly Tyr Glu Leu His Pro Asp Lys Trp Thr Val Gln Pro Ile Gln Leu 395 390 Pro Asp Lys Glu Ser Trp Thr Val Asn Asp Ile Gln Lys Leu Val Gly Lys Leu Asn Trp Ala Ser Gln Ile Tyr Pro Gly Ile Lys Val Lys Gln Leu Cys Lys Leu Leu Arg Gly Ala Lys Ala Leu Thr Asp Ile Val Pro 435 440 Leu Thr Ala Glu Ala Glu Leu Glu Leu Ala Glu Asn Arg Glu Ile Leu 455 Lys Glu Pro Val His Gly Val Tyr Tyr Glu Pro Ser Lys Glu Leu Ile 470 475 Ala Glu Val Gln Lys Gln Gly Leu Asp Gln Trp Thr Tyr Gln Ile Tyr Gln Glu Pro Tyr Lys Asn Leu Lys Thr Gly Lys Tyr Ala Lys Arg Gly Ser Ala His Thr Asn Asp Val Lys Gln Leu Thr Glu Val Val Gln Lys Ile Ala Thr Glu Ser Ile Val Ile Trp Gly Lys Thr Pro Lys Phe Lys 530 535 Leu Pro Ile Arg Lys Glu Thr Trp Glu Val Trp Trp Thr Glu Tyr Trp Gln Ala Thr Trp Ile Pro Asp Trp Glu Phe Val Asn Thr Pro Pro Leu Val Lys Leu Trp Tyr Arg Leu Glu Thr Glu Pro Ile Ala Gly Ala Glu 585 Thr Tyr Tyr Val Asp Gly Ala Ala Asn Arg Glu Thr Lys Leu Gly Lys Ala Gly Tyr Val Thr Asp Lys Gly Lys Gln Lys Ile Ile Thr Leu Thr Glu Thr Thr Asn Gln Lys Ala Glu Leu Gln Ala Ile His Ile Ala Leu 630 635 Gln Asp Ser Gly Ser Glu Val Asn Ile Val Thr Asp Ser Gln Tyr Ala 650 Leu Gly Ile Ile Gln Ala Gln Pro Asp Arg Ser Glu Ser Glu Val Val 665 Asn Gln Ile Ile Glu Gln Leu Ile Lys Lys Glu Lys Val Tyr Leu Ser Trp Val Pro Ala His Lys Gly Ile Gly Gly Asn Glu Gln Val Asp Lys 695 Leu Val Ser Ser Gly Ile Arg Lys Val Leu Phe Leu Asp Gly Ile Asp 705 Lys Ala Gln Glu Glu His Glu Lys Tyr His Ser Asn Trp Arg Ala Met Ala Ser Asp Phe Asn Leu Pro Pro Val Val Ala Lys Glu Ile Val Ala 745 Ser Cys Asp Lys Cys Gln Leu Lys Gly Glu Ala Met His Gly Gln Val Asp Cys Ser Pro Gly Ile Trp Gln Leu Asp Cys Thr His Leu Glu Gly 775 Lys Ile Ile Leu Val Ala Val His Val Ala Ser Gly Tyr Ile Glu Ala 800 785 790 Glu Val Ile Pro Ala Glu Thr Gly Gln Glu Thr Ala Tyr Phe Ile Leu Lys Leu Ala Gly Arg Trp Pro Val Lys Ile Ile His Thr Asp Asn Gly 825 Ser Asn Phe Thr Ser Ala Ala Val Lys Ala Ala Cys Trp Trp Ala Asn 835 Ile Thr Gln Glu Phe Gly Ile Pro Tyr Asn Pro Gln Ser Gln Gly Val

Val Glu Ser Met Asn Lys Glu Leu Lys Lys Ile Ile Gly Gln Val Arg

865 870 875 880

Asp Gln Ala Glu His Leu Lys Thr Ala Val Gln Met Ala Val Phe Ile 885 890 895

His Asn Phe Lys Arg Lys Gly Gly Ile Gly Gly Tyr Ser Ala Gly Glu 900 905 910

Arg Ile Ile Asp Ile Ile Ala Ser Asp Ile Gln Thr Lys Glu Leu Gln 915 920 925

Lys Gln Ile Thr Lys Ile Gln Asn Phe Arg Val Tyr Phe Arg Asp Ser 930 935 940

Arg Asp Pro Ile Trp Lys Gly Pro Ala Lys Leu Leu Trp Lys Gly Glu 945 950 955 960

Gly Ala Val Val Ile Gln Asp Asn Asn Glu Ile Lys Val Val Pro Arg 965 970 975

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<212> DNA

<213> Human immunodeficiency virus

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Ser Ala Ile Thr
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Leu Leu Leu Asn
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<213> Human immunodeficiency virus
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Gln Leu Thr Val
<210> 287
<211> 20
<212> PRT
<213> Human immunodeficiency virus
<400> 287
Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu
Gln Thr Arg Val
<210> 288
<211> 15
<212> PRT
<213> Human immunodeficiency virus
<400> 288
Gly Ile Gln Arg Asn Cys Gln His Leu Trp Arg Trp Gly Thr Met
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<211> 15
<212> PRT
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<210> 290
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<213> Human immunodeficiency virus
<400> 290
Asp Thr Glu Val His Asn Val Trp Ala Thr His Ala Cys Val Pro
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<211> 15
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Cys Pro Lys Val Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala
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Phe Tyr Cys Asn Thr Ser Gly Leu Phe Asn Ser Thr Trp Met Phe
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Phe Asn Ser Thr Trp Met Phe Asn Gly Thr Tyr Met Phe Asn Gly
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Gly Ile Arg Arg Asn Tyr Gln His Trp Trp Gly Trp Gly Thr Met
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Asn Tyr Gln His Trp Trp Gly Trp Gly Thr Met Leu Leu Gly Leu
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Asn Met Trp Lys Asn Asn Met Val Glu Gln Met His Glu Asp Ile
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<212> PRT

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<213> Human immunodeficiency virus
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Ile Ser Phe Glu Pro Ile Pro Ile His Tyr Cys Ala Pro Ala Gly
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<210> 298
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<213> Human immunodeficiency virus
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Asn Ile Ile Gly Thr Ile Arg Gln Ala His Cys Asn Ile Ser Arg
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<213> Human immunodeficiency virus
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Thr Ile Arg Gln Ala His Cys Asn Ile Ser Arg Ala Lys Trp Asn
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Met Arg Val Thr Gly Ile Arg Lys Asn Tyr Gln His Leu Trp Arg Trp
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Gly Thr Met Leu
<210> 301
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Arg Trp Gly Thr Met Leu Leu Gly Met Leu Met Ile Cys Ser Ala Ala
Glu Asn
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<213> Human immunodeficiency virus
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Gly Lys Glu Val His Asn Val Trp Ala Thr His Ala Cys Val Pro Thr
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Asp Pro Asn Pro
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Gly Asp Ile Arg Gln Ala His Cys Asn Ile Ser Lys Asp Lys Trp Asn
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Glu Thr Leu Gln
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<212> PRT
<213> Human immunodeficiency virus
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Val Pro Trp Asn
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<212> DNA
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<400> 305
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ttcagtcgac ggccacc
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<400> 307
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Lys Gln Ile Ile Asn Met Trp Gln Val Val Gly Lys Ala Met Tyr Ala
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<211> 36
<212> PRT
<213> Human immunodeficiency virus
<400> 309
Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr
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Thr Asn Val Asn Val Thr Asn Thr Thr Asn Asn Thr Glu Glu Lys Gly
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Glu Ile Lys Asn
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<213> Human immunodeficiency virus
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Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr
Thr Glu Ile Arg Asp Lys Lys Gln Lys Val Tyr Ala Leu Phe Tyr Arg
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<220>

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Leu Asp Val Val Pro Ile Asp Asp Asn Asn Asn Asn Ser Ser Asn Tyr 35 40 45

Arg

<210> 311

<211> 38

<212> PRT

<213> Human immunodeficiency virus

<400> 311

Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr

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Gln Ala Phe Tyr Ala Thr 35

<210> 312

<211> 44

<212> PRT

<213> Human immunodeficiency virus

<400> 312

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Asn Asn Asn Thr Asn Asp Thr Ile Thr Leu Pro

<210> 313

<211> 36

<212> PRT

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<400> 313

Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr 1 5 10 15

Arg Asp Gly Gly Asn Asn Asn Thr Asn Glu Thr Glu Ile Phe Arg Pro 20 25 30

Gly Gly Gly Asp

35

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<211> 35
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<400> 314
Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr
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Asn Val Arg Asn Val Ser Ser Asn Gly Thr Glu Thr Asp Asn Glu Glu
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Ile Lys Asn
<210> 315
<211> 56
<212> PRT
<213> Human immunodeficiency virus
<400> 315
Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr
Thr Glu Leu Arg Asp Lys Lys Gln Lys Val Tyr Ala Leu Phe Tyr Arg
Leu Asp Val Val Pro Ile Asp Asp Lys Asn Ser Ser Glu Ile Ser Gly
Lys Asn Ser Ser Glu Tyr Tyr Arg
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<210> 316
<211> 38
<212> PRT
<213> Human immunodeficiency virus
<400> 316
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Gln Ala Phe Tyr Ala Thr
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<211> 47
<212> PRT
<213> Human immunodeficiency virus
<400> 317
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Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr
Asn Thr Ser Gly Leu Phe Asn Ser Thr Trp Met Phe Asn Gly Thr Tyr
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Met Phe Asn Gly Thr Lys Asp Asn Ser Glu Thr Ile Thr Leu Pro
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<210> 318
<211> 37
<212> PRT
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Tyr Lys Arg Trp Ile Ile Leu Gly Leu Asn Lys Ile Val Arg Met Tyr
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Arg Asp Gly Gly Asn Asn Ser Asn Lys Asn Lys Thr Glu Thr Phe Arg
Pro Gly Gly Gly Asp
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<210> 319
<211> 4
<212> PRT
<213> Human immunodeficiency virus
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Arg Glu Lys Arg
<210> 320
<211> 26
<212> PRT
<213> Human immunodeficiency virus
<400> 320
Tyr Ile Lys Ile Phe Ile Met Ile Val Gly Gly Leu Ile Gly Leu Arg
Ile Val Phe Ala Val Leu Ser Ile Val Asn
             20
<210> 321
<211> 7
<212> PRT
<213> Human immunodeficiency virus
<400> 321
Glu Leu Asp Lys Trp Ala Ser
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